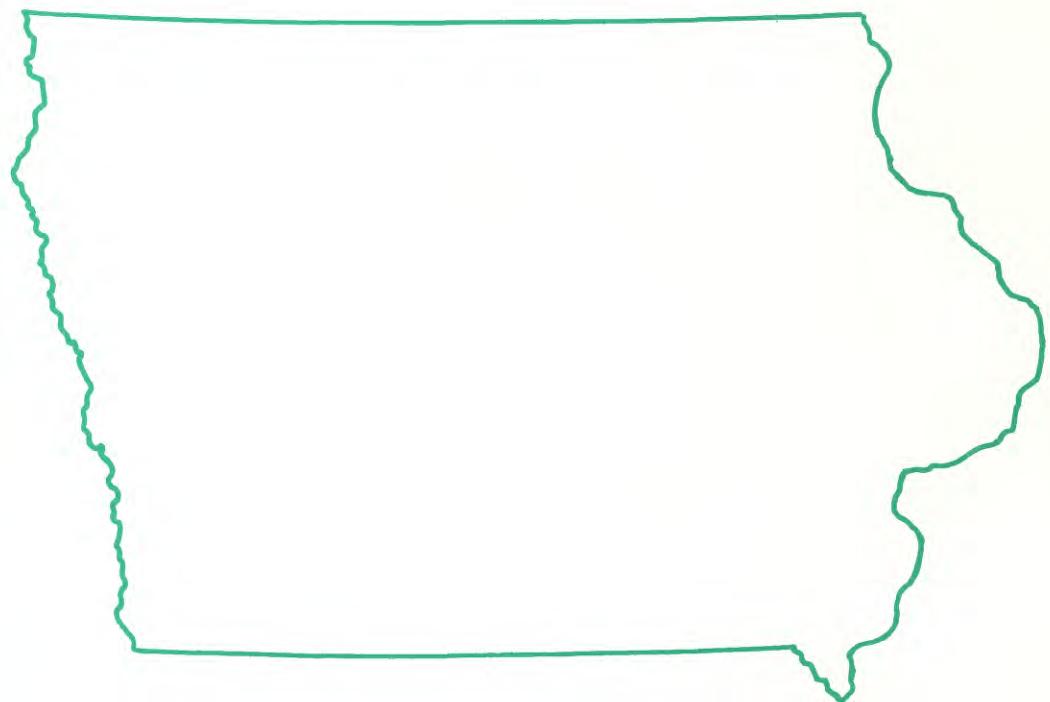




Water Resources Data Iowa

Water Year 1990



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT IA-90-1
Prepared in cooperation with the Iowa Department of Natural
Resources (Geological Survey Bureau), Iowa Department of
Transportation and with Federal agencies

CALENDAR FOR WATER YEAR 1990

1989

OCTOBER

S	M	T	W	T	F	S
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NOVEMBER

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DECEMBER

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1990

JANUARY

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JULY

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AUGUST

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SEPTEMBER

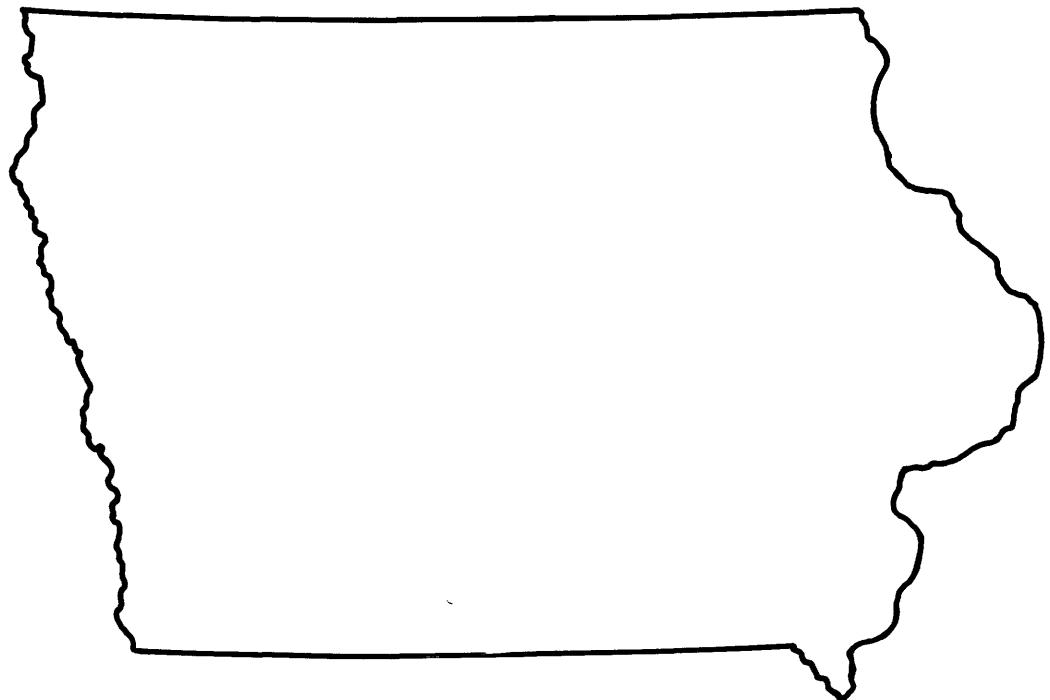
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Water Resources Data Iowa

Water Year 1990

by D.J. O'Connell, M.J. Liszewski, R.B. Lambert, and W.J. Matthes



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT IA-90-1
Prepared in cooperation with the Iowa Department of Natural
Resources (Geological Survey Bureau), Iowa Department of
Transportation and with Federal agencies

DEPARTMENT OF THE INTERIOR

MANUEL LUJAN, JR., Secretary

U.S. GEOLOGICAL SURVEY

Dallas L. Peck, Director

For information on the water program in Iowa write to:

**District Chief, Water Resources Division
U.S. Geological Survey
P.O. Box 1230
Iowa City, Iowa 52244**

1990

PREFACE

This report of Iowa is one of a series of annual reports that document hydrologic data gathered from the U.S. Geological Survey's surface-water and ground-water data-collection networks in each State, Puerto Rico and, the Trust Territories. These records of streamflow, ground-water levels, and quality of water provide the hydrologic information needed by State, local, and Federal agencies, and the private sector for developing and managing our Nation's land and water resources.

This report is the culmination of a concerted effort by dedicated personnel of the U.S. Geological Survey who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. The authors had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to Geological Survey policy and established guidelines. Most of the data were collected, computed, and processed from area field offices. Personnel in charge of the field offices are:

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Von E. Miller, Iowa City Field Headquarters
Alvin R. Conkling, Fort Dodge Field Headquarters

The data were collected, computed and processed by the following personnel:

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J.J. Wellman		

This report was prepared in cooperation with the State of Iowa and with other agencies under the general supervision of N.B. Melcher, District Chief, Iowa.

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16. Abstract (Limit 200 words) Water resources data for the 1990 water year for Iowa consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; ground water levels and water quality of ground-water wells. This report contains records of water discharge for 117 stream-gaging stations; stage or contents for 9 lakes and reservoirs; water quality for 6 stream-gaging stations; sediment records for 10 stream-gaging stations; water levels for 185 observation wells; and chemical analyses for the 248 municipal wells. Also included are 120 crest-stage partial-record stations. Additional water data were collected at various sites, not part of the systematic data-collection program, and are published as miscellaneous discharge measurements and miscellaneous water-quality analyses.			
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GAGING STATIONS, IN DOWNSTREAM ORDER,
FOR WHICH RECORDS ARE PUBLISHED

ix

[Letter after station name designates type of data: (d) discharge,
(c) chemical, (m) microbiological, (t) water temperature,
(s) sediment]

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Well 413359095182701	Local number	78-39-11	CCBC1.....	346
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Well 411244091323501	Local number	74-06-15	CBDD1.....	349
Well 421829091304701	Local number	75-06-14	ABBB1.....	350
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WATER RESOURCES DATA - IOWA, 1990

INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State agencies, obtains a large amount of data pertaining to the water resources of Iowa each water year. These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside of the Geological Survey, the data are published annually in this report series entitled "Water Resources Data - Iowa."

This report contains records for water discharge at 117 gaging stations, stage or contents for 9 lakes and reservoirs, water quality records for 6 gaging stations, sediment records for 10 gaging stations, and water levels for 185 observation wells. Also included are data for 120 crest-stage partial-record stations and water-quality data from 248 municipal wells. Additional water data were collected at various sites not involved in the systematic data-collection program and are published as miscellaneous measurements and analyses. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State, local, and Federal agencies in Iowa.

Records of discharge and stage of streams, and contents or stage of lakes and reservoirs were first published in a series of U.S. Geological Survey water-supply papers entitled, "Surface Water Supply of the United States." Through September 30, 1960, these water-supply papers were in an annual series and then in a 5-year series for 1961-65 and 1966-70. Records of chemical quality, water temperatures, and suspended sediment were published from 1941 to 1970 in an annual series of water-supply papers entitled, "Quality of Surface Waters of the United States." Records of ground-water levels were published from 1935 to 1974 in a series of water-supply papers entitled, "Ground-Water Levels in the United States." Water-supply papers may be consulted in the libraries of the principal cities in the United States or may be purchased from Branch of Distribution, U.S. Geological Survey, 604 South Pickett Street, Alexandria, Virginia, 22304.

For water years 1961 through 1970, streamflow data were released by the Geological Survey in annual reports on a State-boundary basis. Water-quality records for water years 1964 through 1970 were similarly released either in separate reports or in conjunction with streamflow records.

Beginning with the 1971 water year, water data for streamflow, water quality, and ground water are published in official Survey reports on a State-boundary basis. These official Survey reports carry an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this report is identified as "U.S. Geological Survey Water-Data Report IA-90-1." These water-data reports are for sale, in paper copy or in microfiche, by the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22161.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at the address given on the back of the title page or by telephone, (319) 337-4191.

COOPERATION

The U.S. Geological Survey and organizations in the State of Iowa have had cooperative agreements for the systematic collection of streamflow records since 1914, for ground water levels since 1935, and for water-quality records since 1943. Organizations that assisted in collecting data through cooperative agreement with the Survey in water year 1990 are:

Iowa Department of Natural Resources (Geological Survey Bureau),
Donald L. Koch, Bureau Chief and State Geologist

University of Iowa, Institute of Hydraulic Research, Robert
G. Hering, Dean of College of Engineering and John F. Kennedy,
Director

University of Iowa, Hygenics Laboratory, W.J. Hausler, Jr.,
Director

Iowa Department of Transportation, Highway Division, Robert
Humphrey, Director, and Vernon J. Marks, Research Engineer

Iowa State University, Richard E. Hasbrook, Contracts and Grants
Officer, and Iowa State Water Resources Research Institute,
T. Al Austin, Director

City of Cedar Rapids, Donald Canney, Mayor

City of Des Moines, John Dorrian, Mayor

City of Fort Dodge, Micheal D. McCarville, Mayor

Assistance in the form of funds or services was given by the Corps of Engineers, U.S. Army, in collecting flow records for 77 gaging stations. Assistance was also furnished by NOAA-National Weather Service, U.S. Department of Commerce.

The following organizations aided in collecting records:

Union Electric Co; Des Moines Water Works; Waterloo Sewage Treatment Plant; University of Iowa; West Central Iowa Rural Water Association; and cities of, Charles City, Clear Lake, Denison, Iowa City, Marshalltown, Sioux City and Waterloo.

Organizations that supplied data are acknowledged in station descriptions.

SUMMARY OF HYDROLOGIC CONDITIONS

Surface Water

Water year 1990 (October 1, 1989 to September 30, 1990) was characterized by variable precipitation and streamflows across Iowa. Recorded precipitation for the year ranged from 1.36 inches below normal in the northwest Iowa climatological district to 10.60 inches greater than normal in the central Iowa climatological district (fig. 1). Statewide precipitation of 36.79 inches was 115 percent of the normal 32.09 inches for 1951-80 (table 1). Water year 1990 ranked as the 18th wettest and the 40th warmest in 117 years of record (In this summary of hydrologic conditions, all data and statistics pertaining to precipitation in Iowa were provided by Harry Hillaker, State Climatologist, Iowa Department of Agriculture and Land Stewardship, oral and written commun., 1990).

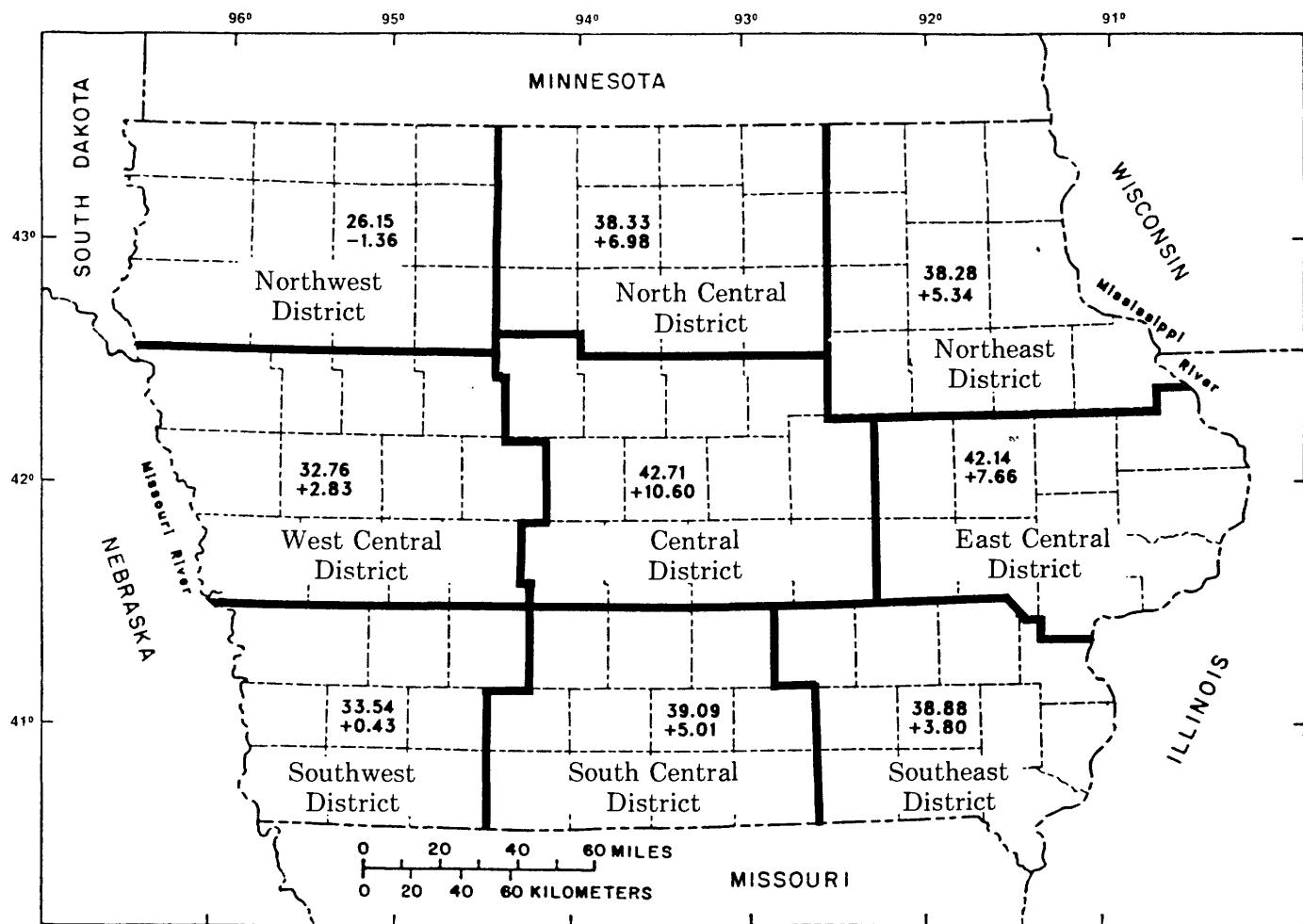
Water year 1989 was the 11th driest 12-month period of recorded annual precipitation (1873-1989). This sustained dry period contributed to the less-than-average discharge during the early part of water year 1990 at two of three index stations in Iowa. In the following discussions, deficient-, normal-, and excessive-flow ranges are defined by the percentile distribution of monthly mean discharges of a specific month for the period 1951-80. A monthly mean discharge is in the deficient-flow range if its value is less than or equal to the 25th percentile, in the normal-flow range if its value is between the 25th and 75th percentiles, and in the excessive-flow range if its value is greater than the 75th percentile.

Table 1.--Monthly and annual precipitation during water year 1990 as a percentage of normal precipitation (1951-80). [Source: Harry Hillaker, State Climatologist, Iowa Department of Agriculture and Land Stewardship, written commun., 1990]

Climatological District	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
Northwest	8	32	30	84	26	169	67	137	160	112	78	49	95
North Central	87	35	17	66	55	207	115	113	143	200	142	55	122
Northeast	122	44	29	100	57	179	82	119	158	119	205	30	116
West Central	58	14	44	50	37	208	41	173	180	165	70	42	109
Central	131	14	30	73	47	245	87	170	195	205	99	53	133
East Central	60	14	25	109	99	189	65	157	268	114	170	31	122
Southwest	90	1	54	113	41	200	34	132	133	213	66	26	101
South Central	102	2	46	137	94	189	85	152	168	195	67	47	115
Southeast	63	8	42	104	171	208	60	159	205	151	71	38	111
Statewide	82	19	34	93	69	201	71	147	179	163	108	41	115

WATER RESOURCES DATA - IOWA, 1990

Monthly mean discharge at the index station 05464500 Cedar River at Cedar Rapids was in the deficient-flow range during October through February and April, in the normal-flow range during March and May, and in the excessive-flow range during June through September (fig. 2). Monthly mean discharge at the index station 05480500 Des Moines River at Fort Dodge was in the deficient-flow range during October through April, and in the normal-flow range for the remaining months, except June, during which it was in the excessive-flow range. Monthly mean discharge at the index station 06810000 Nishnabotna River above Hamburg was in the normal-flow range during October through January and March through May, and in the excessive-flow range during June through August of water year 1990.



EXPLANATION

39.09 PRECIPITATION, IN INCHES, DURING WATER YEAR 1990
+5.01 DEVIATION FROM LONG-TERM AVERAGE (1951-80), IN INCHES

Figure 1.--Precipitation record in the National Weather Service's designated climatological districts for water year 1990. (Source: Harry Hillaker, State Climatologist, Iowa Department of Agriculture and Land Stewardship, written commun., 1990.)

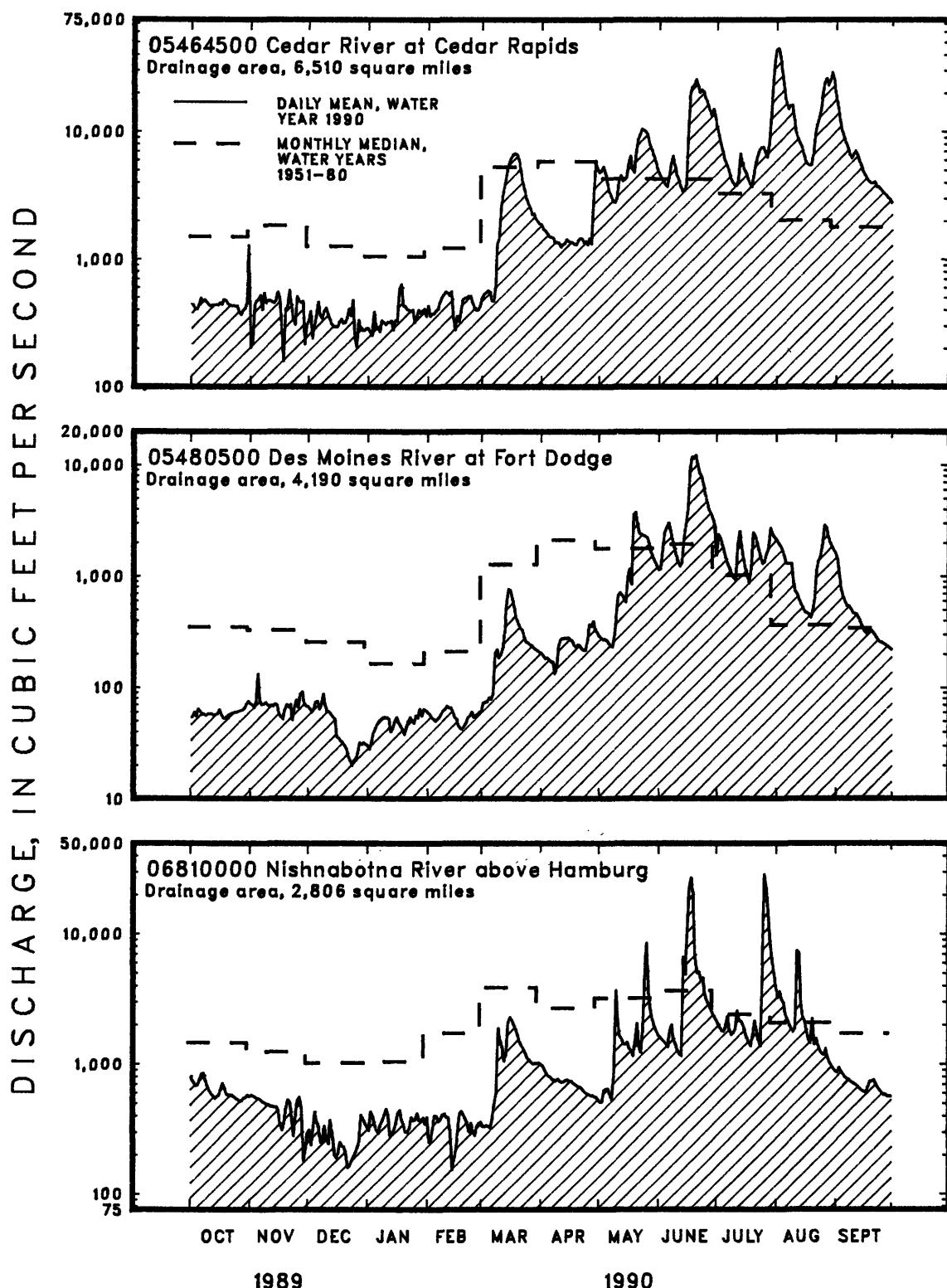


Figure 2.--Daily mean discharge for water year 1990 compared with the monthly median of the monthly mean discharges for water years 1951-80 for three index stations.

During October 1989, statewide average precipitation was 1.88 inches, or 82 percent of normal. Precipitation ranged from 8 percent of normal in northwest Iowa to 131 percent of normal in central Iowa. October 1989 marked the end the 20th driest January-through-October period on record. Streamflows generally declined slightly during the month. A new low October mean discharge of 463 ft³/s (cubic feet per second) occurred at the index station on the Cedar River at Cedar Rapids.

During November and December, precipitation was about 26 percent of normal for the State. November was the 9th driest November on record. December was the 5th driest and 4th coldest on record. December marked the end of the 7th driest January-through-December period on record. Streamflows generally were affected by ice and decreased during November and December. New low monthly mean discharges were set for November, 410 ft³/s, and December, 290 ft³/s, at the index station on the Cedar River at Cedar Rapids.

Recorded statewide average precipitation during January 1990 was 93 percent of normal, but average temperatures were the 3rd warmest on record for January. Record high temperatures January 14-16 caused the melting of snow cover, resulting in a general increase in streamflows throughout the State.

Above-normal temperatures and below-normal precipitation were also recorded in February. Statewide average precipitation was 0.70 inches or 69 percent of the normal statewide precipitation of 1.02 inches. Discharges at all three index stations continued to recede and were in the deficient-flow range.

During March, statewide average precipitation was 4.32 inches or 201 percent of the normal precipitation of 2.15 inches. Precipitation ranged from 169 percent of normal in northwest Iowa to 245 percent of normal in central Iowa. This was the wettest March in Iowa in 118 years of record. Streamflows increased significantly across the state. Rivers and streams in the southern two-thirds of the State experienced the greatest increases. Flooding occurred along the Skunk River in southeast Iowa when the river crested 1 to 3 feet above flood stage on March 15th, and on the Wapsipinicon River at De Witt when the river crested about 1 foot above flood stage on the 16th. Streamflows declined gradually at the end of the month. During March the monthly mean discharge at the index station on the Cedar River at Cedar Rapids increased to the normal-flow range for the first time in 12 months. However, the monthly mean discharge at the index station on the Des Moines River at Fort Dodge remained in the deficient-flow range for the 12th consecutive month. The March mean discharge at the index station on the Nishnabotna River above Hamburg was in the normal-flow range.

During April, recorded precipitation varied from 34 percent of normal in southwest Iowa to 115 percent of normal in north-central Iowa. Statewide, the average precipitation was 2.28 inches or 71 percent of normal. Streamflows generally receded throughout State. Between 1 1/2 to 2 1/2 inches of rain fell across south-central Iowa. This caused minor flooding of agricultural lands along the Chariton River.

Statewide average precipitation for May was 5.82 inches or 147 percent of the normal statewide precipitation of 3.96 inches. Precipitation ranged from 113 percent of normal in north-central Iowa to 173 percent of normal in west-central Iowa. The monthly mean discharge at the index station on the Des Moines River at Fort Dodge was in the normal-flow range after being in the deficient-flow range for 13 consecutive months. On May 18-19, an intense thunderstorm in west-central and northwest Iowa produced from 4 to 8 inches of rainfall, causing serious flooding in the Sioux City area. The gage on Perry Creek at 38th Street, Sioux City recorded a new maximum stage of 28.54 feet (about 4 feet above flood stage) and a discharge of 8,670 ft³/s. The recurrence interval of this flood was computed to be about 40 years. Intense rainfall in the southern half of Iowa May 18th and 19th, caused minor flooding in the Little Sioux, Iowa, Cedar, Skunk and Raccoon River basins. Additional heavy rains on May 25th and 26th, caused more flooding in the Iowa, Skunk, Raccoon, Des Moines, and Chariton River basins.

Major flooding occurred on most rivers and streams in central and east-central Iowa during the last half of June. The statewide average precipitation for June was 8.02 inches or 179 percent of the normal precipitation of 4.48 inches. Precipitation ranged from 133 percent of normal in southwest Iowa to 268 percent of normal in east-central Iowa. The June precipitation for the east-central climatological district was the largest amount recorded for any month in 118 years of record. Statewide, June 1990 was the 4th wettest on record. The first six months of calendar year 1990 were the 4th wettest on record. Monthly mean discharges at all three index stations were in the excessive-flow range. Because of widespread flooding, 44 counties were declared Disaster Areas by the Governor and 33 counties were declared Disaster Areas by Presidential Declaration. There were two flood-related deaths in the State. June flooding resulted in new maximum stages or discharges being established at the following 13 stream-gaging stations:

Station number	Stream	Drainage area (square miles)	Date (June 1990)	Gage height (feet)	Discharge (cubic feet per second)	Recurrence interval, (years)
05422000	Wapsipinicon R. near De Witt	2,330	17	14.19	31,100	100
05422470	Crow Creek at Bettendorf	17.8	16	11.03	7,700	(a) 1.54
05451500	Iowa River near Marshalltown	1,564	18	20.38	17,300	10
05454300	Clear Creek near Coralville	98.1	17	16.36	11,700	(a) 1.18
05455100	Olds Man's Creek near Iowa City	201	17	17.20	10,400	<50
05465000	Cedar River near Conesville	7,785	18	16.87	60,100	<25
05465500	Iowa River at Wapello	12,499	19	28.91	86,600	(b)

Station number	Stream	Drainage area (square miles)	Date (June 1990)	Gage height (feet)	Discharge (cubic feet per second)	Recurrence interval, (years)
05470500	Squaw Creek at Ames	204	17	15.97	12,500	(a) 1.60
05471050	South Skunk R. at Colfax	803	20	19.07	8,770	(b)
05471500	South Skunk R. near Oskaloosa	1,635	23	23.05	15,200	<25
05486000	North River near Norwalk	349	17	25.33	22,600	(a) 1.09
05487470	South River near Ackworth	460	17	31.25	38,100	(a) 1.16
06609500	Boyer River at Logan	871	17	22.54	30,800	(a) 1.02

a, ratio to 100 year flood

b, not determined

<, less than

Statewide average precipitation for July was 6.42 inches or 163 percent of the normal statewide precipitation of 3.95 inches. Precipitation ranged from 112 percent of normal in northwest Iowa to 213 percent of normal in southwest Iowa. This was the 6th wettest July in 118 years of record. The first 7 months of the calendar year, January through July, were the wettest on record for this 7-month period. The July mean discharges at the index stations were in the excessive-flow range, except at the station on the Des Moines River at Fort Dodge, which was in the normal-flow range. Streamflows were extremely variable during the month. Flooding occurred at various times in the Chariton, Iowa-Cedar, Nishnabotna, Skunk, Thompson, and Wapsipinicon River basins. A new maximum stage of 18.45 feet (discharge 22,900 ft³/s) was recorded on the West Fork Cedar River at Finchford on July 29. The computed recurrence interval of this flood was 23 years.

Recorded statewide average precipitation during August was 4.43 inches or 108 percent of normal. Precipitation ranged from 66 percent of normal in southwest Iowa to 205 percent of normal in northeast Iowa. January through August 1990 was the second wettest for this period in 118 years of record. The August mean discharges at the index stations on the Cedar River at Cedar Rapids and Nishnabotna River above Hamburg were in the excessive-flow range while the August mean discharge on the Des Moines River at Fort Dodge was in the normal-flow range. A new maximum August mean discharge of 17,520 ft³/s was recorded on the Cedar River at Cedar Rapids, surpassing the previous maximum of 13,130 ft³/s. Flooding occurred in the lower Nishnabotna, Maquoketa, Turkey and Wapsipinicon River basins. On August 25th a new maximum stage of 16.76 feet (discharge 8,320 ft³/s) was recorded on the Turkey River at Spillville.

Statewide average precipitation during September was 1.41 inches or 41 percent of the normal statewide average of 3.42 inches. This was the 10th driest September on record. Streamflows generally decreased throughout the State. The September mean discharge was in the excessive-flow range at the index station on the Cedar River at Cedar Rapids and in the normal-flow range at the index stations on the Des Moines River at Fort Dodge and the Nishnabotna River above Hamburg.

Suspended-Sediment

Daily suspended-sediment discharge data (hereafter referred to as sediment discharge in this report) were collected at five long-term stream-gaging stations (stations with 5 years or more of record) and two stream-gaging stations that were established during water year 1988. The long-term stations are: 05389500 Mississippi River at McGregor, 05465500 Iowa River at Wapello, 05474000 Skunk River at Augusta, 05481650 Des Moines River near Saylorville, and 06817000 Nodaway River at Clarinda. The two newer stations are 05451500 Iowa River at Marshalltown and 05471050 South Skunk River at Colfax. The locations of active and discontinued sediment and water-quality stations are shown in figure 3.

The sediment discharge at the five long-term stations reflected the variable statewide precipitation during water year 1990. Low sediment discharge rates occurred at all five stations for the first 5 months of water year 1990. The sediment discharge in the Mississippi River at McGregor during this 5-month period was about 9 percent of the annual sediment discharge, and the sediment discharge at the other four long term stations during this time were equal to or less than 1.0 percent of the annual sediment discharge.

The annual sediment discharge in the Mississippi River at McGregor, the Des Moines River near Saylorville, and the Nodaway River at Clarinda were all lower than the respective historical average sediment discharge (fig. 4). Eight percent of the annual sediment discharge in the Nodaway River at Clarinda occurred during March, 44 percent occurred during May and 38 percent occurred during June. About 76 percent of the annual sediment discharge in the Des Moines River at Saylorville, which is located below a flood control reservoir, occurred during June, July, and August. The annual sediment discharge was more uniform throughout the year in the Mississippi River at McGregor, which is regulated for navigation. The highest monthly sediment discharge occurred at this station during March.

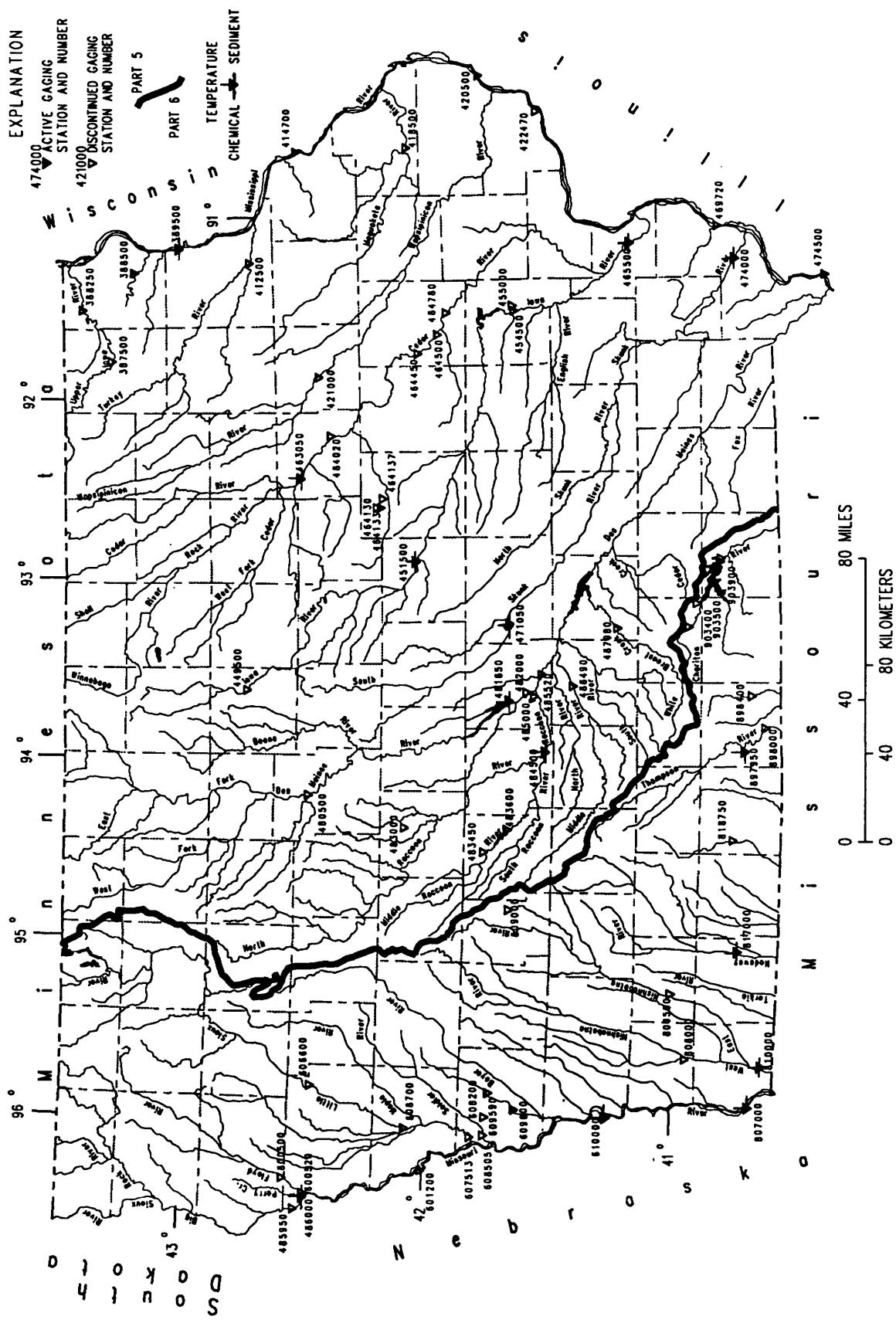


Figure 3. -- Location of active and discontinued surface water-quality stations.

Annual sediment discharges in the Iowa River at Wapello and in the Skunk River at Augusta exceeded the respective historical average discharges (fig. 4). The annual sediment discharge on the Iowa River at Wapello was 4,330,000 tons, the second greatest annual sediment discharge during 12 years of record. One half of the annual sediment discharge occurred during June; most of the remainder occurred during the combined months of March, May, July, August, and September. A new maximum daily sediment discharge of 604,000 tons per day occurred on June 20th. The drainage area at this station is 12,499 mi². The annual sediment discharge in the Skunk River at Augusta was 3,100,000 tons, the sixth greatest during 15 years of record. About 42 percent of the annual sediment discharge occurred during June; the remaining 58 percent occurred mostly during March, May, July, August, and September. The drainage area is 4,303 mi².

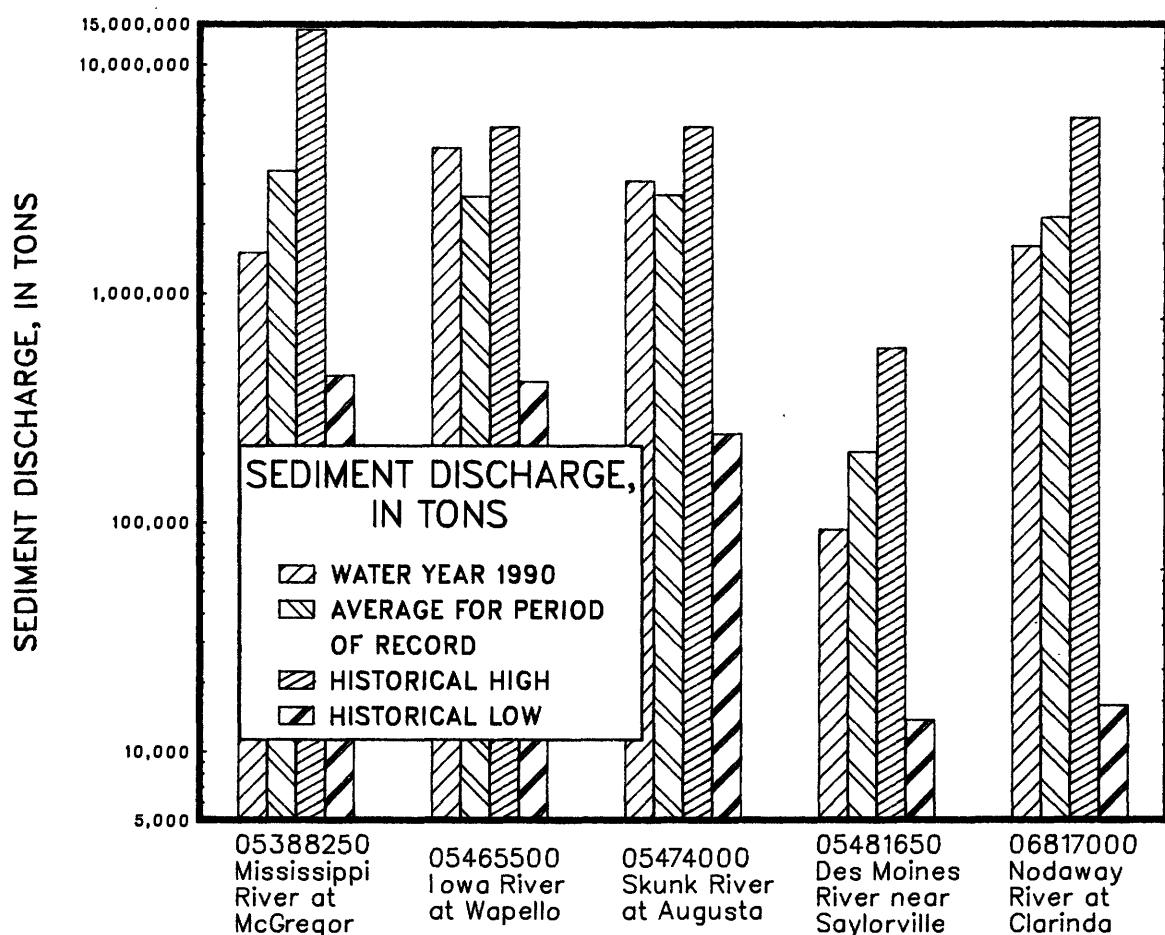


Figure 4.--Comparison of total annual suspended-sediment discharge for water year 1990 with average annual suspended-sediment discharge, lowest annual sediment discharge, and highest annual sediment discharge for the period of record at the five long-term daily sediment stations in Iowa.

The sediment discharge characteristics of the Iowa River at Marshalltown and the South Skunk River at Colfax generally are similar to those of, respectively, the Iowa River at Wapello and the Skunk River at Augusta. The maximum monthly sediment discharges occurred in May and June, and less than one percent of the annual sediment discharge occurred during the first five months of water year 1990. The annual sediment discharge at the Iowa River at Marshalltown was 703,000 tons; the drainage area is 1,564 mi². The annual sediment discharge at the South Skunk River at Colfax was 371,000 tons; the drainage area is 803 mi².

Ground Water

Monitoring the water-level changes in wells completed in aquifers on a long-term basis provides valuable information on the effects of natural and human-induced stresses on the ground-water resources in Iowa. The resulting long-term, regional data base is used to evaluate changes in ground-water storage through time in the major aquifers, assess and predict the effects of development on future supplies, and provide the data necessary to effectively manage the resource. The ground-water-level observation network in Iowa consists of approximately 240 observation wells that are measured quarterly, intermittently, monthly, or daily. Three wells located in Linn, Marion, and Webster Counties were selected as index wells on the basis of their geographical distribution and the length of their record (fig. 5).

Ground-water in Iowa is withdrawn from both unconsolidated aquifers and, in most areas, deep bedrock aquifers. The unconsolidated aquifers consist of alluvial sand and gravel, glacial drift, and lenses of sand and gravel overlain by glacial drift known as buried-channel aquifers. Buried-channel aquifers exist where coarse sand and gravel were deposited in bedrock valleys and overlain by glacial drift. The major bedrock aquifers are: (1) Dakota aquifer, in sandstone of Cretaceous age, (2) Mississippian aquifer, in limestone and dolomite of Mississippian age, (3) Silurian-Devonian aquifer, in dolomite of Silurian and limestone of Devonian age, (4) Cambrian-Ordovician aquifer, in dolomite and sandstone of Late Cambrian to Early Ordovician age, and (5) Dresbach aquifer, in sandstone of Early Cambrian age.

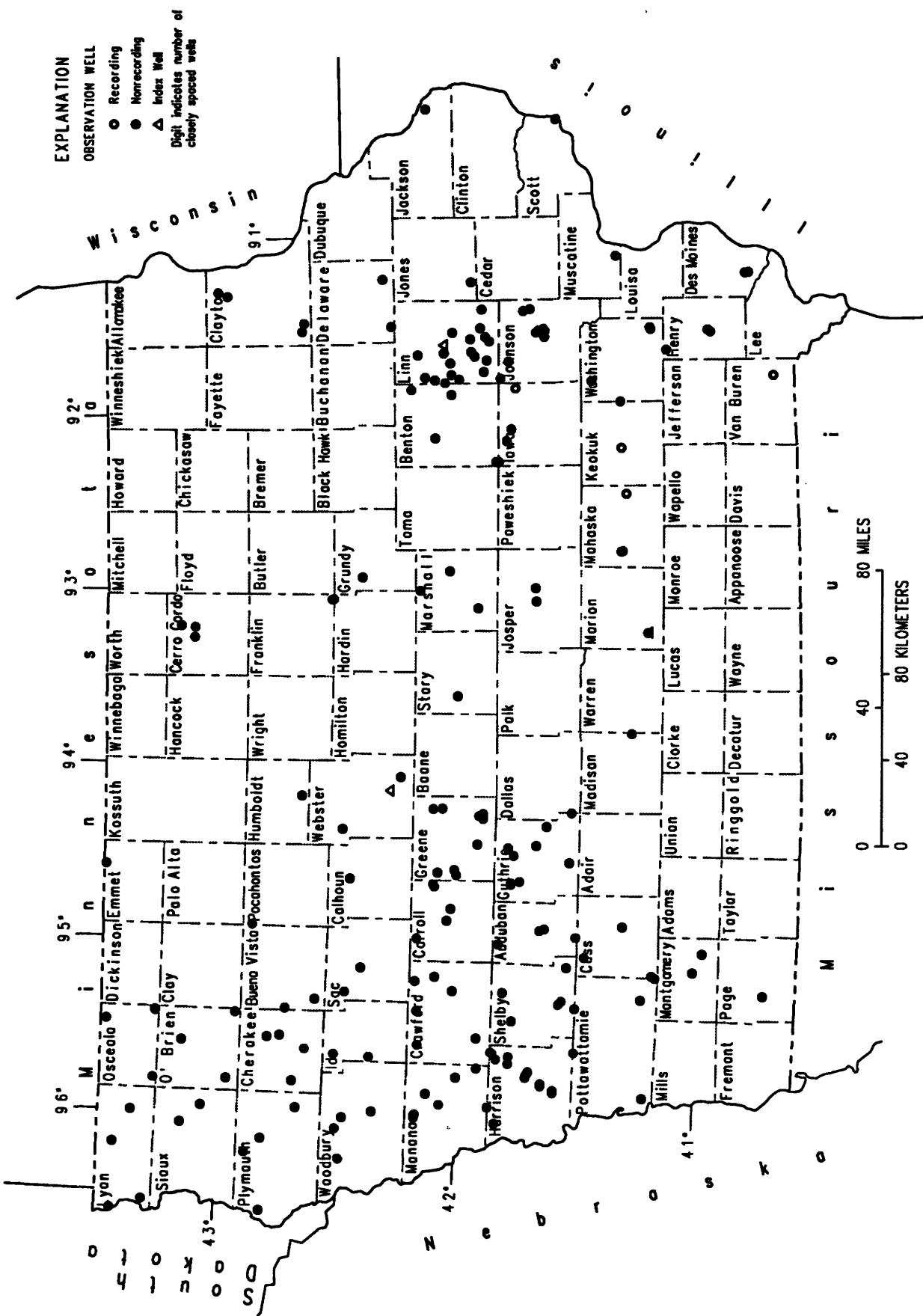


Figure 5. — Location of recording and nonrecording wells in the ground-water-level observation network in Iowa.

Recharge to the unconsolidated glacial drift aquifers occurs mainly by infiltration of precipitation, and is dependent on the amount of precipitation received in the immediate area. Water levels in alluvial and glacial-drift aquifers commonly exhibit a moderate rise in level during the fall, then a gradual decline during the winter. In the spring, precipitation and runoff from snowmelt generally produce a rise in the water levels followed by a gradual decline throughout the summer. Hydrographs of the monthly water levels measured in water year 1990 at the index wells are compared to the long-term average monthly water levels in figure 6. During water year 1990, less-than-normal precipitation across Iowa from October through February kept water levels in the index wells at or below average levels until March, 1990. The water levels measured in the index well completed in glacial drift of Pleistocene age in Linn County were below average from October, 1989 until March, 1990. The water-levels in the well completed in glacial drift in Webster County were at or below average from November through February. Water levels in the well completed in glacial drift in Marion County remained about average from October through May, and then rose to above-average levels during the summer in response to greater-than-normal precipitation in south-central Iowa.

Water levels in other wells completed in unconsolidated aquifers were also adversely affected by the dry conditions across most of Iowa. The continued lack of precipitation during the fall and early winter resulted in new historical low water levels in 15 wells completed in unconsolidated aquifers (table 2). Most of the historical low water levels were measured in wells completed in alluvial or glacial drift material located in west-central and southwest Iowa. Outside this region, the only historical low water levels measured were in the well completed in glacial drift in Humboldt County, and the well completed in alluvium in Iowa County. All of the new historic low water levels in wells completed in unconsolidated aquifers surpassed previous record low levels measured during water year 1989.

Table 2.--Historical low water levels measured during water year 1990 in wells completed in unconsolidated aquifers. Water-level measurements are in feet below land-surface datum.

County	Well number	Aquifer	Historical	Date	Previous	Date
			low	measured	historical	measured
Greene	415448094163401	North Raccoon alluvial	21.21	10/02/89	20.83	01/17/89
Greene	415449094155601	glacial drift	40.13	02/13/90	39.52	07/12/89
Greene	420723094143201	buried channel	41.78	10/02/89	41.43	01/12/89
Guthrie	414728094392401	South Raccoon alluvial	16.94	02/14/90	16.65	04/04/89
Harrison	413024095353901	glacial drift	61.29	07/13/90	60.54	07/05/89
Harrison	413836095465502	Boyer alluvial	14.73	12/20/89	14.08	05/18/89
Harrison	414228095442301	Boyer alluvial	24.50	02/02/90	22.43	08/09/89
Harrison	415109095363201	Boyer alluvial	13.22	12/15/89	12.47	08/09/89
Humboldt	424039094103601	glacial drift	19.29	03/12/90	16.72	03/16/89
Iowa	414816092053401	Iowa alluvial	9.33	01/26/90	9.19	07/27/89
Monona	420730095910701	Maple alluvial	15.79	01/11/90	15.21	07/07/89
Monona	421006095580301	Little Sioux alluvial	14.58	01/11/90	13.92	07/07/89
Pottawattamie	411359095171901	buried channel	128.54	03/27/90	128.02	09/29/89
Shelby	413359095182701	buried channel	153.77	07/13/90	153.16	07/05/89
Shelby	414856095160101	buried channel	211.08	01/12/90	210.95	07/05/89

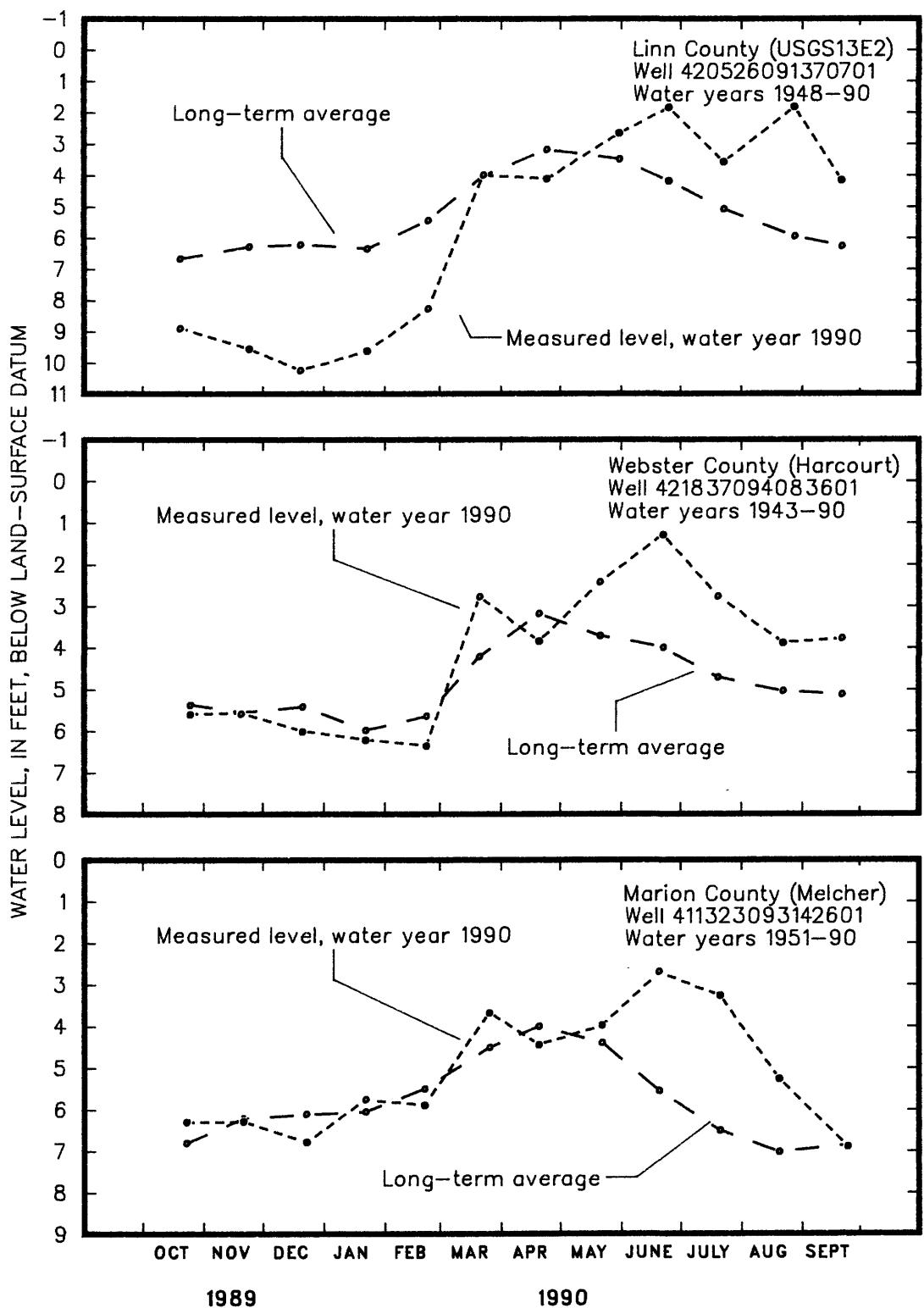


Figure 6.--Monthly water levels during water year 1990 compared to the average monthly levels for the period of record for three wells completed in glacial drift.

While not directly dependent on local infiltration by precipitation, recharge to confined buried-channel and bedrock aquifers is affected by long-term changes in climatic conditions as well as induced stresses such as pumping. In most cases, the response of the confined aquifers to natural and induced stresses is not as rapid as the response exhibited by unconfined, unconsolidated aquifers. In western Iowa, new historical low water levels were measured in three wells completed in buried channel aquifers in Pottawattamie and Shelby Counties. Similar to the response in unconsolidated aquifers, water levels in wells completed in the bedrock aquifers declined further during water year 1990. As an indication of a continued decrease in storage of water in these aquifers, new historical lows were measured in 37 wells completed in major bedrock aquifers in Iowa (table 3). These new historical low water levels exceeded many historical low water levels that were measured during water year 1989. About one-half of these new historical low water levels were measured in wells completed in the Dakota aquifer, which is primarily found in northwest and west-central Iowa. New historical low water levels were also measured in wells completed in the Silurian and Silurian-Devonian aquifers in east-central Iowa. These new lows surpassed many previous historical lows measured during 1975-77 and 1989, when Iowa experienced drought conditions.

Surface-Water Quality

Surface-water-quality data were collected in Iowa during water year 1990 at five National Stream-Quality Accounting Network (NASQAN) sites and one Hydrologic Benchmark Network (HBMN) site. The NASQAN sites in Iowa are: 05463050 Cedar River at Cedar Falls, 05465500 Iowa River at Wapello, 05474000 Skunk River at Augusta, 05484500 Raccoon River at Van Meter, and 06810000 Nishnabotna River above Hamburg. The HBMN site is 06897950 Elk Creek near Decatur City (fig. 3). The combined drainage area of the six sites is approximately 28,000 square miles. Land-use throughout the six drainage areas is primarily agricultural. Samples were collected six times during the water year at each of the NASQAN sites and four times at the HBMN site.

High nitrate concentrations in Iowa streams caused several municipalities that use surface water as their primary source to issue health advisories regarding the consumption of public water by small children and pregnant women. Nearly all of the samples collected at the six sites contained detectable concentrations of agricultural chemicals. Nitrate plus nitrite as nitrogen (hereafter referred to as nitrate) was detected most frequently with 31 samples containing concentrations above the detection limit of 0.1 mg/L (milligrams per liter). Nitrate concentrations in two samples exceeded 10 mg/L, which is the U.S. Environmental Protection Agency (USEPA) maximum contaminant level (MCL) for public drinking water (USEPA, 1988, Maximum contaminant levels, subpart B of part 141, National interim primary drinking-water regulations: U.S. Code of Federal Regulations, Title 40, Parts 100 to 149, revised as of July 1, 1988, p. 530-533). The concentrations were 13 mg/L at Raccoon River at Van Meter in June 1990, and 11 mg/L at Cedar River at Cedar Falls in August 1990.

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Table 3.--Historical low water levels measured during water year 1990 in wells completed in bedrock aquifers. Water levels are in feet below land-surface datum.

County	Well number	Aquifer	Historical low	Date Measured	Previous historical low	Date measured
Audubon	413044094565601	Dakota	53.55	04/12/90	53.09	07/05/89
Audubon	413958094544501	Dakota	41.87	07/13/90	40.71	04/05/89
Benton	420459091500201	Silurian-Devonian	12.47	12/01/89	12.40	07/16/77
Buena Vista	424023095571401	Dakota	61.84	09/18/90	58.80	08/30/89
Buena Vista	425233094545001	Dakota	133.85	09/18/90	133.67	09/11/81
Carroll	420705094394501	Dakota	57.30	02/13/90	56.14	07/12/89
Cherokee	423833095365701	Dakota	37.25	01/10/90	37.22	09/10/81
Cherokee	421320095480211	Dakota	156.55	04/11/90	155.50	12/15/80
Cherokee	424459095322411	Cambrian-Ordovician	27.21	07/12/90	26.28	10/19/88
Delaware	422029091144302	Silurian	27.19	12/30/89	26.49	07/31/89
Greene	415449094161501	Pennsylvanian	6.57	02/13/90	5.93	07/12/89
Greene	415449094173201	Pennsylvanian	73.67	02/13/90	73.09	07/12/89
Greene	415608094260701	Dakota	14.92	10/02/89	14.72	01/12/89
Greene	420603094355101	Penn./Dakota	41.60	02/13/90	40.97	01/07/86
Harrison	414955096000601	Pennsylvanian	65.35	07/11/90	64.50	07/07/89
Johnson	414149091331501	Silurian-Devonian	96.74	11/16/89	92.54	07/30/75
Johnson	415052091483801	Silurian-Devonian	98.27	03/26/90	90.38	09/11/89
Linn	415534091251102	Cambrian-Ordovician	338.73	12/20/89	337.96	09/25/89
Linn	415556091313001	Silurian	53.29	12/01/89	52.95	09/11/89
Linn	420300091325801	Silurian	50.26	12/01/89	50.19	07/06/77
Linn	420508091395811	Silurian	57.50	12/01/89	55.27	09/11/89
Linn	421149091403301	Silurian-Devonian	34.27	12/01/89	33.61	09/11/89
Linn	420954091480801	Silurian-Devonian	35.12	12/01/89	34.58	09/11/89
Linn	420730091490401	Silurian	108.11	12/01/89	105.90	09/11/89
Lyon	431812096302701	Dakota	104.65	07/12/90	101.30	07/06/89
Lyon	432553096105701	Dakota	115.10	09/18/90	114.68	09/12/89
Lyon	432601096335511	Dakota	158.25	04/11/90	157.53	08/12/82
Monona	421018095582001	Dakota	17.85	04/10/90	15.77	10/17/88 and 07/07/89
Monona	421018095591301	Dakota	56.81	07/11/90	55.50	10/19/82
Osceola	431620095250511	Dakota	194.18	11/20/89	194.11	07/25/82
Osceola	431620095482402	Dakota	229.50	07/12/90	226.19	07/06/89
Plymouth	425249096125001	Dakota	122.97	10/03/89	122.35	07/06/89
Sac	422500095084801	Penn./Dakota	165.40	03/29/90	165.40	12/16/80
Sac	422850095171501	Dakota	292.46	06/12/90	292.28	05/31/89
Shelby	414624095252301	Dakota	131.70	04/12/90	116.56	07/05/89
Sioux	430913096033201	Dakota	195.86	10/04/89	195.12	07/06/89
Washington	412037091564701	Mississippian	25.72	12/10/89	25.29	08/23/89 and 08/24/89

At least two of the water samples collected at each site during the year contained detectable concentrations of herbicides. The greatest concentration of any herbicide detected was 1.3 $\mu\text{g/L}$ (micrograms per liter) of cyanazine, which was in a sample collected from the Iowa River at Wapello in May 1990. The greatest concentration of atrazine was 1.1 $\mu\text{g/L}$, which was detected in the sample collected from the Iowa River at Wapello in March 1990. The greatest concentration of alachlor was 0.43 $\mu\text{g/L}$, which was detected in the sample collected from the Iowa River at Wapello in May 1990. All concentrations of atrazine and alachlor detected this water year were less than the greatest concentrations of these compounds detected during water year 1989, and are less than the USEPA proposed maximum contaminant levels (PMCL). Organophosphate insecticides were not detected in samples for which these insecticides were analyzed.

The dissolved solids and nitrate data collected in water year 1990 from the Iowa River at Wapello, Skunk River at Augusta, and Nishnabotna River above Hamburg are plotted over boxplots of the respective historical data, grouped by month, in figures 7, 8, and 9. Boxplots summarize graphically the characteristics of the grouped data, showing the median, variation, and skewness of the data. The historical data were collected during water years 1978-1989. Samples were not collected every month each year; however, during the period of record, enough samples have been collected to determine the boxplots. Daily mean discharges for water year 1990 are included in the figures to illustrate the general relation between water-quality data and flow conditions at each site.

Concentrations of dissolved solids during water year 1990 were variable compared to monthly medians (50th percentile) for the period of record. Monthly medians were exceeded in four of six samples collected at each location throughout the year. The remaining two samples were below monthly medians. Two samples from the Iowa River at Wapello and Nishnabotna River above Hamburg contained dissolved solids concentrations outside the interquartile range (25th to 75th percentile). One sample from the Iowa River at Wapello was above the 75th percentile and one sample was below the 25th percentile (fig. 7). Both samples from the Nishnabotna River above Hamburg were above the 75th percentile (fig. 9). Five samples from the Skunk River at Augusta contained dissolved solids concentrations outside of the interquartile range, four samples were above the 75th percentile, and one sample below the 25th percentile (fig. 8).

Nitrate concentrations were also variable during water year 1990. Nitrate concentrations exceeded monthly medians in four samples from the Iowa River at Wapello, three samples from the Skunk River at Augusta, and one sample from the Nishnabotna River above Hamburg. The remaining samples were below monthly medians at these sites. All six samples from the Iowa River at Wapello were outside the interquartile range, four samples exceeded the 75th percentile and two samples were below the 25th percentile. Three samples from the Skunk River at Augusta were outside the interquartile range, one sample above the 75th percentile and two samples below the 25th percentile. Two samples from the Nishnabotna River above Hamburg were outside the interquartile range, both of which were below the 25th percentile.

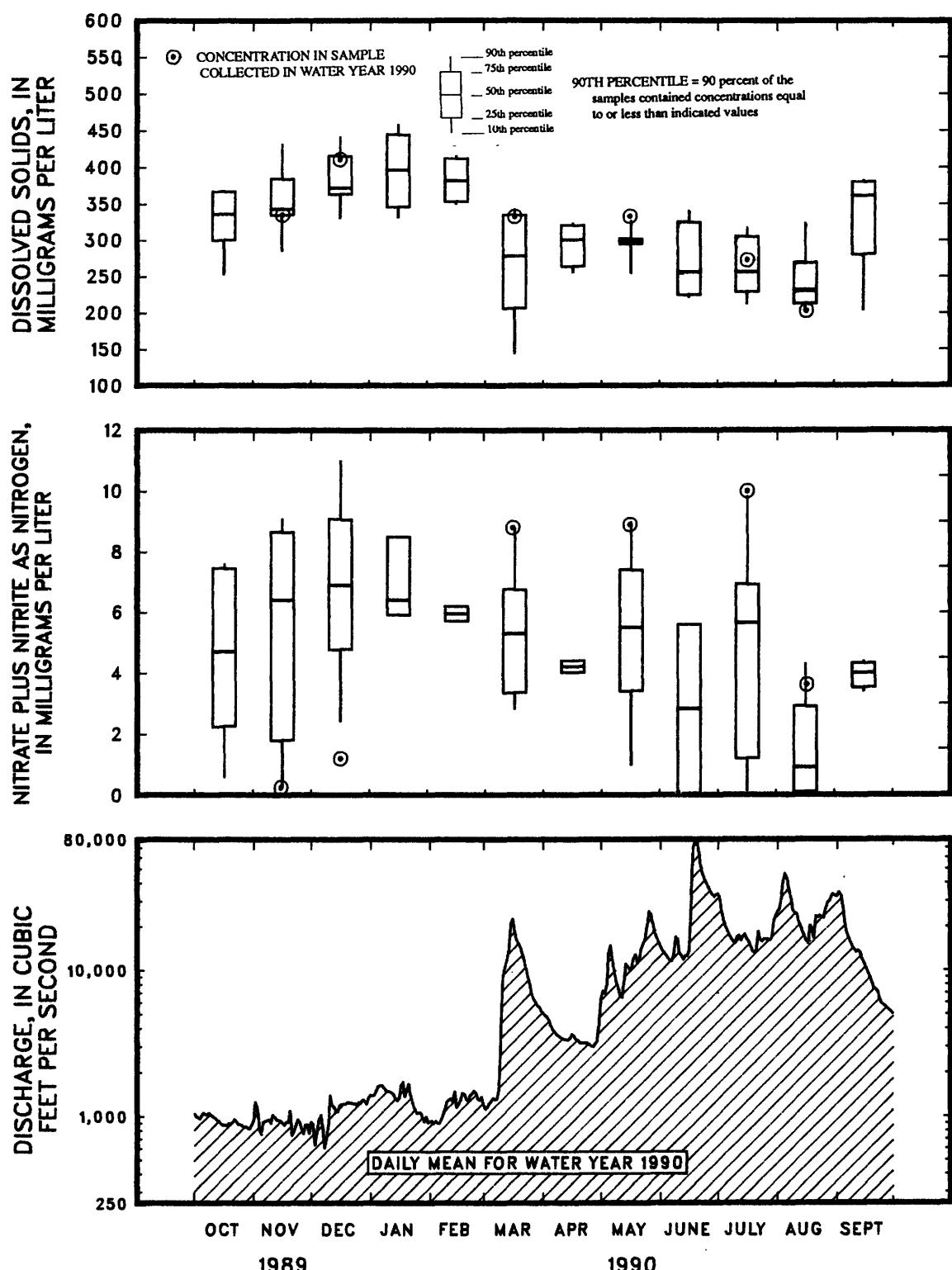


Figure 7.--Comparison of dissolved-solids and nitrate concentrations for water year 1990 with historical data (1978-89) summarized by monthly boxplots at the NASQAN station on the Iowa River at Wapello (station 05465500; period of record, water years 1978-90).

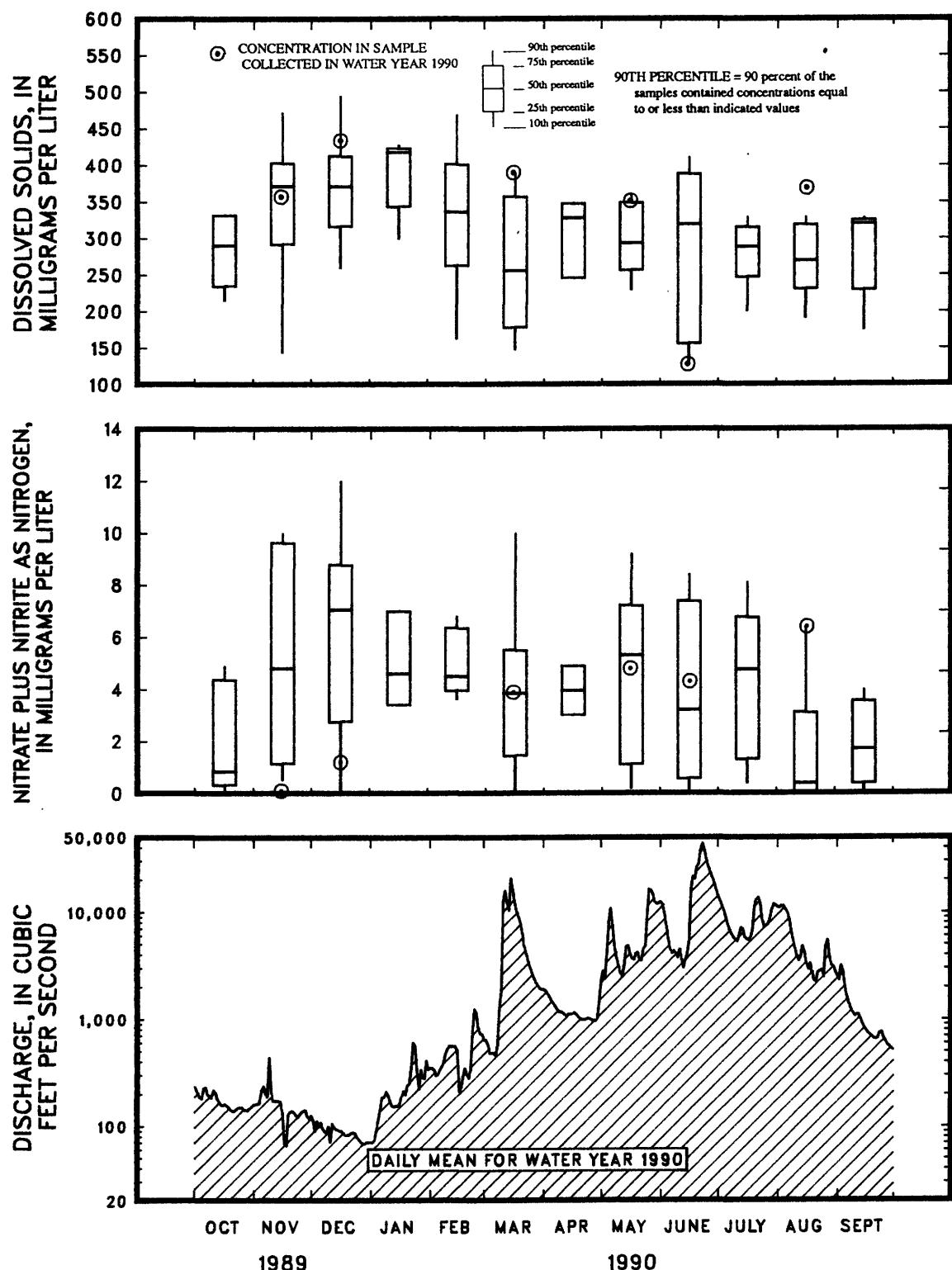


Figure 8.--Comparison of dissolved-solids and nitrate concentrations for water year 1990 with historical data (1978-89) summarized by monthly boxplots at the NASQAN station on the Skunk River at Augusta (station 05474000; period of record, 1978-90).

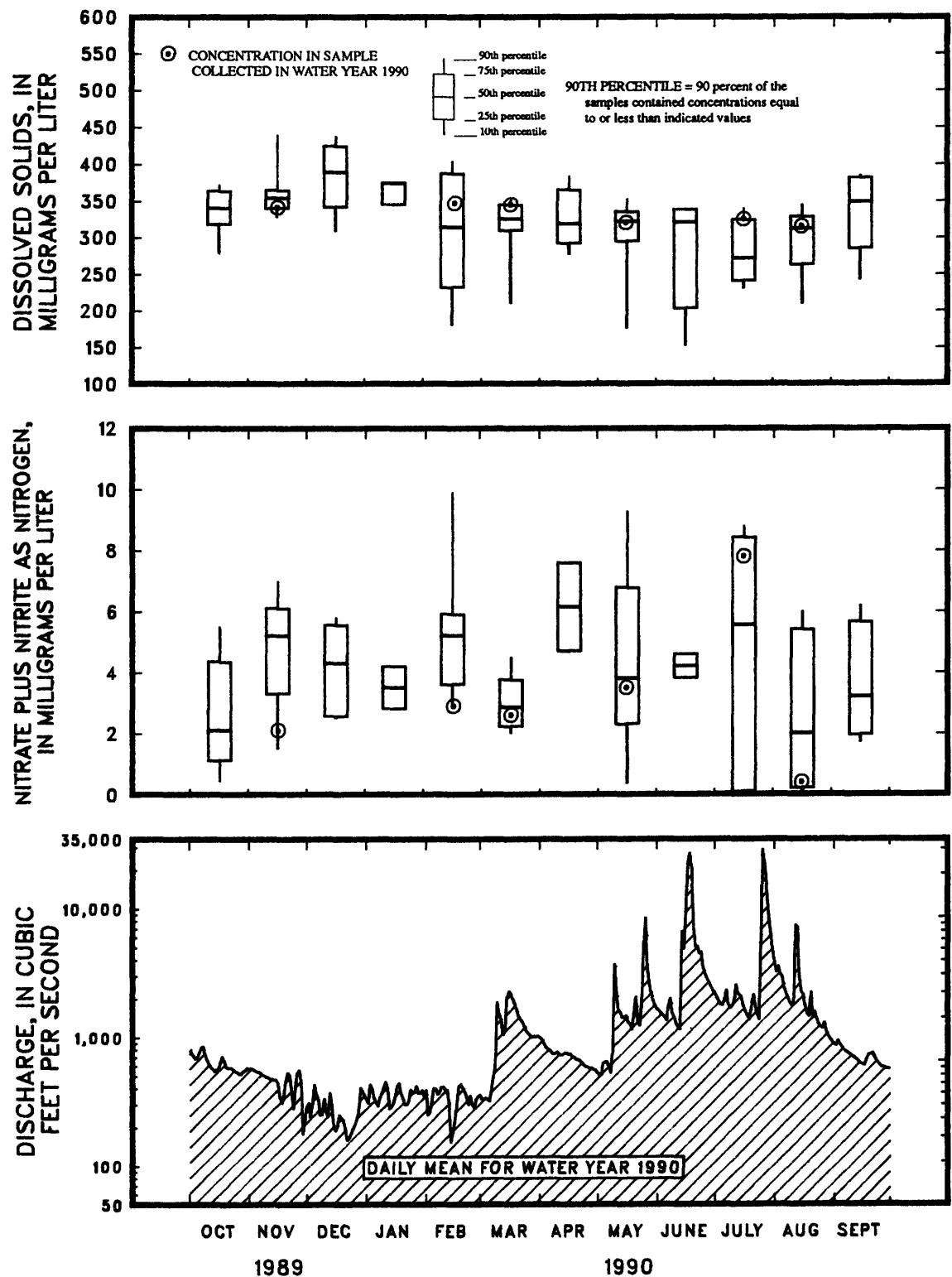


Figure 9.--Comparison of dissolved-solids and nitrate concentrations for water year 1990 with historical data (1978-89) summarized by monthly boxplots at the NASQAN station on the Nishnabotna River above Hamburg (station 06810000; period of record, water years 1978-90).

Ground-Water Quality

The Iowa District's ground-water-quality monitoring program has been operated since 1982 by the U.S. Geological Survey in cooperation with the University of Iowa Hygienic Laboratory and the Iowa Department of Natural Resources, Geological Survey Bureau. The purpose of the program is to provide consistent and representative ground-water-quality data that describe the chemical quality of municipal ground-water supplies from major aquifers in the State of Iowa. Between 200 and 250 municipal supply wells are selected and sampled annually out of a current inventory of approximately 1,800 wells. Since 1985, the emphasis of the monitoring program has been on the analysis for nitrogen and herbicides in water samples collected from shallow wells (less than 200 feet deep).

When the monitoring program began, wells to be sampled were selected annually on a rotating basis and sampled once during April through November. During 1988 and 1989, 50 of the wells that had consistently yielded water samples with relatively large concentrations of nitrates, herbicides, or both, were sampled three times during each year to assess seasonal variation.

While the ground-water-quality monitoring program has been successful in providing assessments of the water quality of individual municipal water supplies, the resultant database is not statistically sufficient to permit assessment of the overall water-quality throughout the State, or to permit the study of long term water-quality trends. In order to provide a more statistically sound basis for water-quality data analysis, a sampling strategy based on random selection of wells weighted by aquifer vulnerability was implemented in water year 1990. Aquifer vulnerability was determined by the frequency of atrazine detections in water samples collected from wells completed in the respective aquifers. Fifty wells were selected for a permanent network of wells that will be sampled annually. Samples from this network will provide year-to-year continuity of data from major aquifers. Approximately 180 of the remaining wells in the monitoring network will be selected and sampled annually on a rotating basis.

During water year 1990, 228 untreated water samples were collected from municipal wells (fig. 10) located throughout the State. These samples were analyzed by the University of Iowa Hygienic Laboratory, and the results are published in this report. Forty-nine samples were from the permanent network and 179 samples were from the rotational network. The wells that were sampled were grouped by aquifer type and randomly selected by a computer program weighted by historical atrazine detection frequencies in the database. One hundred and sixty-two of the sampled wells were completed in unconsolidated aquifers and 66 wells were completed in bedrock aquifers. One hundred and eighty-five wells are less than 200 feet deep.

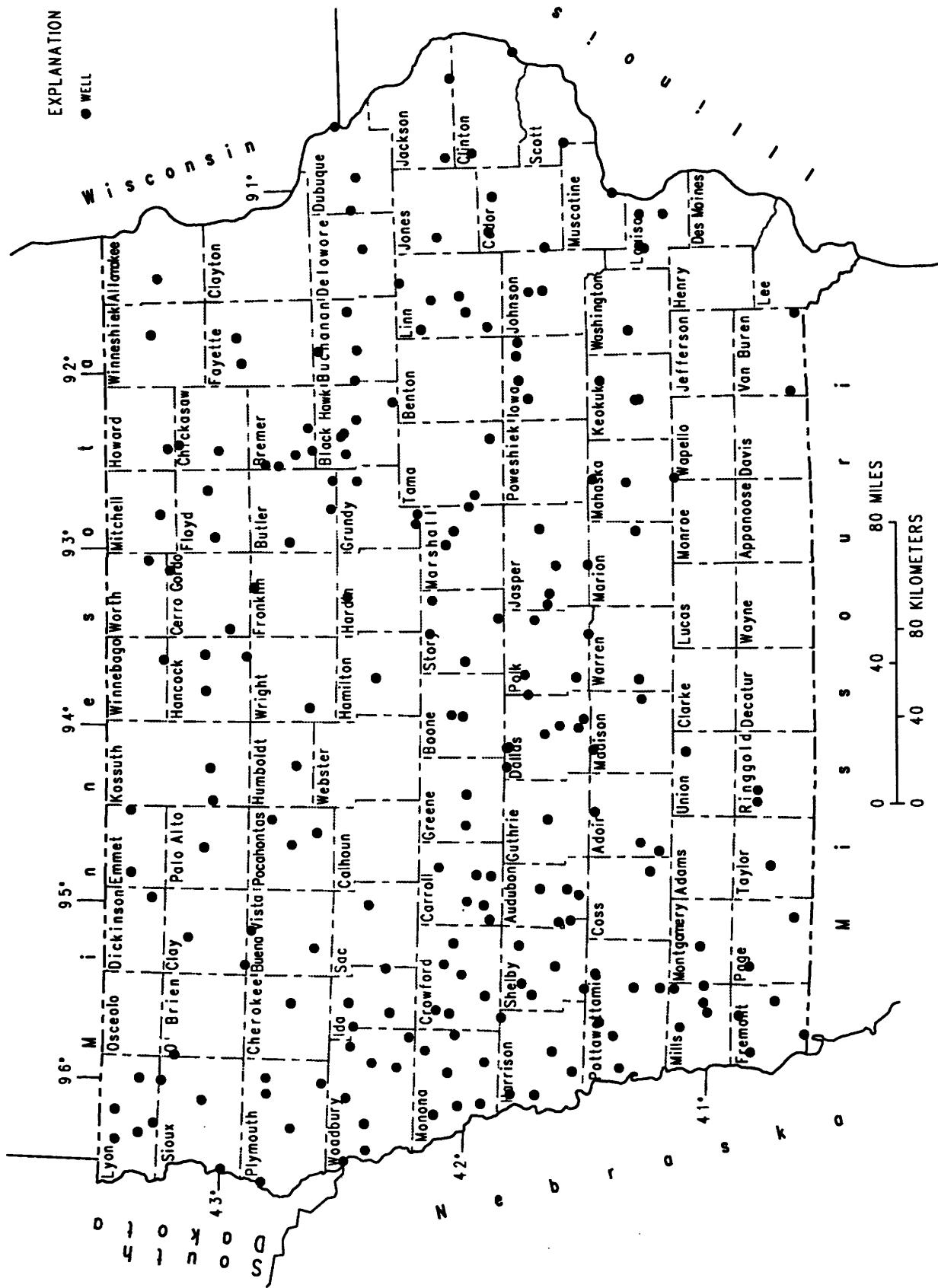


Figure 10. -- Location of wells in the ground-water-quality monitoring program from which water samples were collected during water year 1990.

Samples were collected during July, August, and September 1990. All samples were analyzed for nutrients. Samples from wells less than 300 feet deep were analyzed for common herbicides. Samples from wells equal to or greater than 300 feet deep were analyzed for radionuclides. Samples from wells that had never been sampled previously as part of the monitoring program were also analyzed for common dissolved inorganic constituents. In addition, samples from 24 shallow alluvial wells were analyzed for synthetic organic compounds (SOC's). The discussion of analytic results will be limited to the nitrogen species nitrate and ammonia, to herbicides, and to SOC's.

Information from 26 samples collected during the fall of 1989 as part of the water year 1989 sampling program but not previously reported are presented in the Ground-Water-Quality Data section. They are not discussed in this report.

A summary of results of the analyses are listed by compound in table 4. Nitrate or ammonia were detected in 214 of 223 samples tested for these compounds, and herbicides were detected in 55 of 214 samples.

Table 4.--Summary of nitrogen species and herbicides detected in samples from the ground-water quality network. [$\mu\text{g}/\text{L}$, micrograms per liter; mg/L , micrograms per liter; <, less than detection limit.]

Compound	Number of samples analyzed	Number of samples in which compound was detected	Detection limit	Maximum concentration detected
Nitrate	223	144	0.1 mg/L	19.0 mg/L
Ammonia	223	111	0.1 mg/L	5.7 mg/L
Atrazine	214	40	0.1 $\mu\text{g}/\text{L}$	5.3 $\mu\text{g}/\text{L}$
Alachlor	214	4	0.1 $\mu\text{g}/\text{L}$	3.3 $\mu\text{g}/\text{L}$
Metolochlor	214	6	0.1 $\mu\text{g}/\text{L}$	2.4 $\mu\text{g}/\text{L}$
Cyanazine	214	7	0.1 $\mu\text{g}/\text{L}$	0.42 $\mu\text{g}/\text{L}$
Metribuzin	214	1	0.1 $\mu\text{g}/\text{L}$	0.35 $\mu\text{g}/\text{L}$
Butylate	214	0	0.1 $\mu\text{g}/\text{L}$	<0.1 $\mu\text{g}/\text{L}$
Trifluralin	214	0	0.1 $\mu\text{g}/\text{L}$	<0.1 $\mu\text{g}/\text{L}$

Nitrate concentrations were greater than 3 mg/L in 66 of 223 samples. In general, nitrate concentrations greater than 3 mg/L can be attributed to human activities (Madison, R.J., and Brunett, J.O., 1984, Overview of the occurrence of nitrate in ground water of the United States, in National Water Summary 1984--Water-Quality Issues: U.S. Geological Survey Water-Supply Paper 2275, p. 93-103). Concentrations in 17 samples exceeded 10 mg/L, which is the USEPA MCL for public drinking water. Atrazine concentrations exceeded the USEPA proposed maximum contaminant level (PMCL) of 3 $\mu\text{g}/\text{L}$ in 3 of 214 samples, and alachlor concentrations exceeded the USEPA PMCL of 2 $\mu\text{g}/\text{L}$ in 1 of 214 samples (USEPA, 1989, Proposed rule, National primary and secondary drinking water regulations; U.S. Federal Registar, Volume 54, Number 97, May 22, 1989, p. 22,064). None of the samples analyzed for SOC's contained detectable concentrations of SOC's.

Of the 144 samples that contained detectable concentrations of nitrate, 126 were collected from wells less than 200 feet deep. Of the 55 samples from wells containing detectable concentrations of herbicides, 43 were from wells less than 200 feet deep. The greater proportion of samples containing nitrate, or herbicides, or both, were from wells less than 200 feet deep which is consistent with data collected in previous years.

The frequency of detection of herbicides (about 26 percent of the sampled wells) in water year 1990 is greater than the frequency of detection for water year 1989 (19 percent). However, a direct comparison of frequency of detections may be misleading because different sets of wells were sampled in each water year. The increased frequency of detection in water year 1990 may be because of greater precipitation during the year relative to water year 1989, which may have aided in the leaching of agricultural chemicals into ground water.

SPECIAL NETWORKS AND PROGRAMS

Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Radiochemical Program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Tritium Network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for the 1990 water year that began October 1, 1989, and ended September 30, 1990. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, water-quality data for surface and ground water, and ground-water-level data. The locations of the stations and wells where the data were collected are shown in figures 3, 5, 10-12. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

Station Identification Numbers

Each data station, whether streamsite or well, in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The systems used by the U.S. Geological Survey to assign identification numbers for surface-water stations and for ground-water well sites differ, but both are based on geographic location. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is used for wells.

Downstream Order System

Since October 1, 1950, the order of listing hydrologic-station records in Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a mainstream station are listed before that station. A station on a tributary that enters between two mainstream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary with respect to the stream to which it is immediately tributary is indicated by an indentation in the "List of Stations" in the front of this report. Each indentation represents one rank. This downstream order and system of indentation shows which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

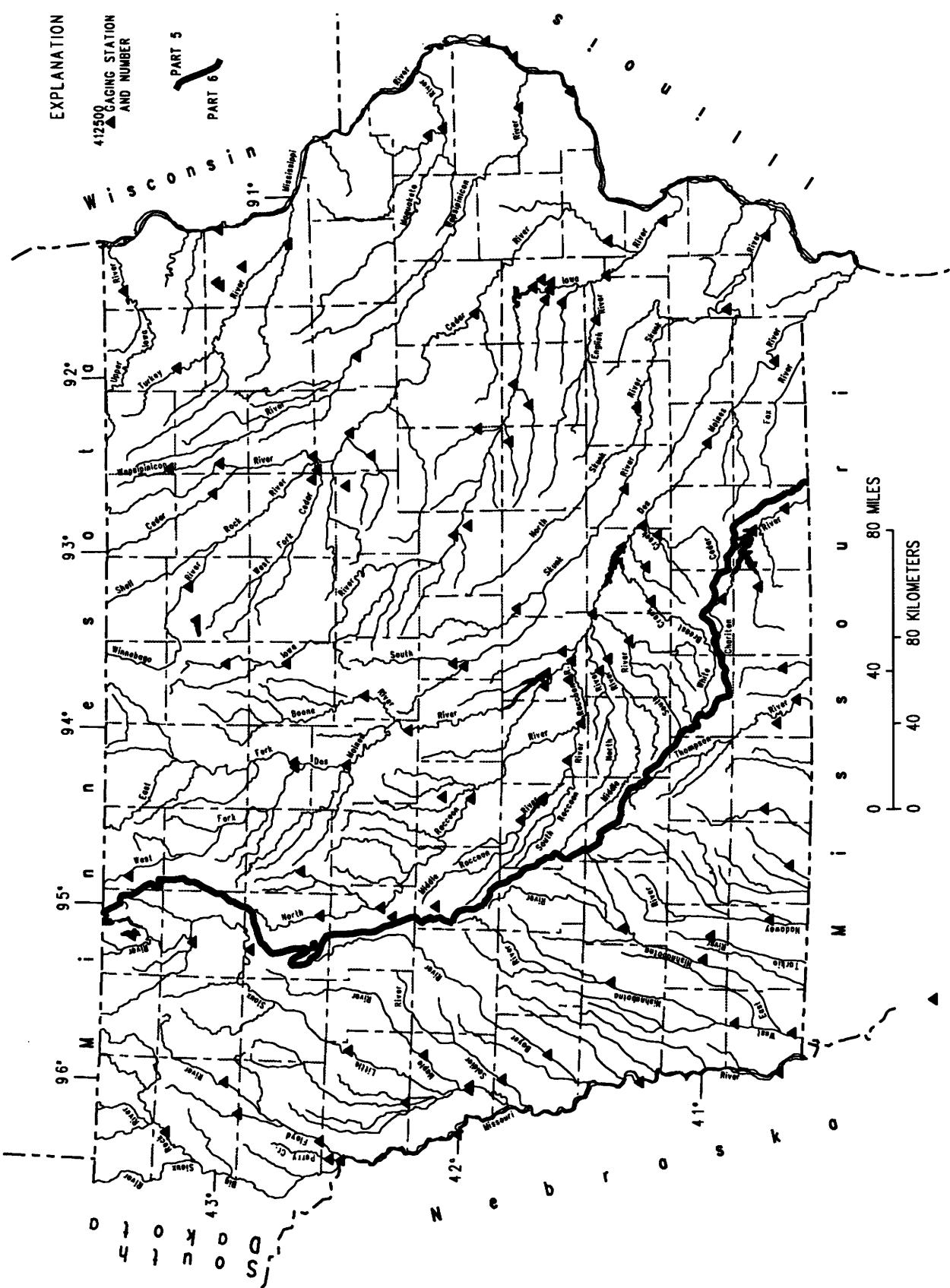


Figure 11. -- Location of active, continuous-record gaging stations.

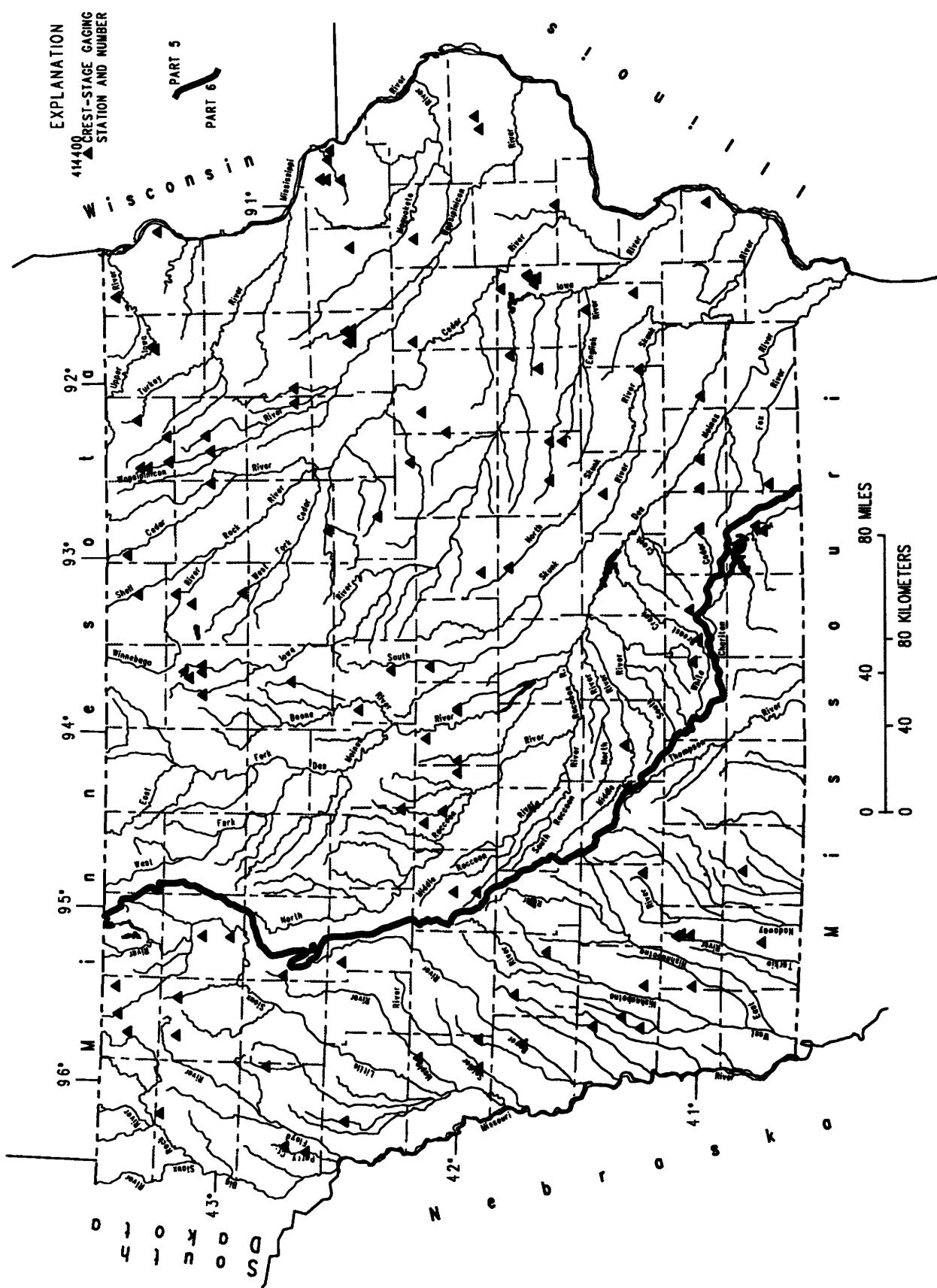


Figure 12. -- Location of active, crest-stage gaging stations.

The station-identification number is assigned according to downstream order. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete eight-digit number for each station, such as 05388250, which appears just to the left of the station name, includes the two-digit Part number "05" plus the six-digit downstream-order number "388250." The Part number designates the major river basin; for example, Part "05" is the Mississippi River Basin.

Latitude-Longitude System

The identification numbers for wells and miscellaneous surface-water sites are assigned according to the grid system of latitude and longitude. The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the wells or other sites within a 1-second grid. This site-identification number, once assigned, is a pure number and has no locational significance. In the rare instance where the initial determination of latitude and longitude are found to be in error, the station will retain its initial identification number; however, its true latitude and longitude will be listed in the LOCATION paragraph of the station description. (See figure below.)

Latitude and longitude coordinates for wells:
1. 414315N 091252001.
2. 414315N 091252002.
3. 414316N 091251901.

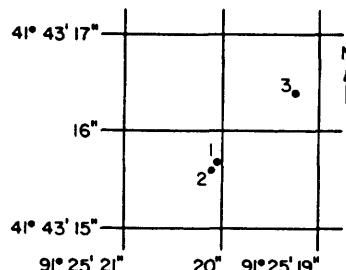


Figure 13.--Latitude-longitude well number.

Numbering System For Wells

Each well is identified by means of (1) a 15-digit number that is based on the grid system of latitude and longitude, and (2) a local number that is provided for continuity with older reports and for other use as dictated by local needs. The former number serves not only to identify the well but also to locate it as a point on a map (fig. 8). For maximum utility, latitude and longitude code numbers are determined to seconds in order that each well may have a unique number. The first six digits denote degrees, minutes, and seconds of north latitude; the next seven digits are degrees, minutes, and seconds of west longitude; and the last two numbers are a sequential number assigned in the order in which the wells are located in a 1-second quadrangle.

The local well numbers are in accordance with the Bureau of Land Management's system of land subdivision. Each well number is made up of three segments. The first segment indicates the township, the second the range, and the third the section in which the well is located (fig. 14). The letters after the section number which are assigned in a counter-clockwise direction (beginning with "A" in the northeast quarter), represent subdivisions of the section. The first letter denotes a 160-acre tract, the second a 40-acre tract, the third a 10-acre tract, and the fourth a 2.5 acre tract. Numbers are added as suffixes to distinguish wells in the same tract. Thus, the number 96-20-3CDBD1 designates the well in the SE 1/4 NW 1/4 SE 1/4 SW 1/4 sec.3, T.96 N., R.20 W.

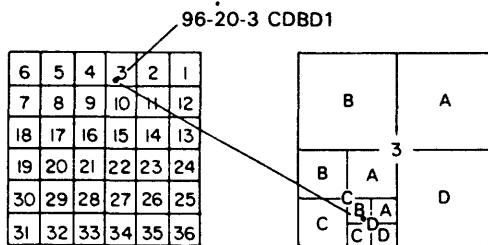


Figure 14.--Local well-numbering system for well 96-20-3CDBD1.

Records of Stage and Water Discharge

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharges may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or period of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations." Location of all complete-record surface water stations which are given in this report are shown in figure 11.

Partial records are obtained through discrete measurements without using a continuous stage-recording device and generally pertain only to a characteristic of either high, medium or low flow. The location of all active, crest-stage gaging stations are shown in figure 12.

Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relationships between stage and discharge. These data, together with supplemental information, such as weather records, are used to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relationship between stage and lake content. These data are used with stage-capacity curves or tables to compute lake storage.

Continuous records of stage are obtained with analog recorders that trace continuous graphs of stage or with digital recorders that punch stage values on paper tapes at selected time intervals. Measurements of discharge are made with current meters using methods adopted by the Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, in Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water-Resources Investigations, Book 3, Chapter A6.

In computing discharge records, results of individual measurements are plotted against the corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements are prepared. If it is necessary to define extremes of discharge outside the range of the current-meter measurements, the curves are extended using: (1) logarithmic plotting; (2) velocity-area studies; (3) results of indirect measurements of peak discharge, such as slope-area or contracted-opening measurements, and computations of flow over dams or weirs; or (4) step-backwater techniques.

Daily mean discharges are computed by applying the daily mean stages (gage heights) to the stage-discharge curves or tables. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on the individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control. For some stations, formation of ice in the winter may so obscure the stage-discharge relations that daily mean discharges must be estimated from other information such as temperature and precipitation records, notes of observations, and records for other stations in the same or nearby basins for comparable periods.

At some stream-gaging stations, the stage-discharge relation is affected by the backwater from reservoirs, tributary streams, or other sources. This necessitates the use of the slope method in which the slope or fall in a reach of the stream is a factor in computing discharge. The slope or fall is obtained by means of an auxiliary gage set at some distance from the base gage. At some stations the stage-discharge relation is affected by changing stage; at these stations the rate of change in stage is used as a factor in computing discharge.

In computing records of lake or reservoir contents, it is necessary to have available from surveys, curves or tables defining the relationship of stage and content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relation changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relation. Even when this is done, the contents computed may become increasingly in error as the lapsed time since the last survey increases. Discharges over lake or reservoir spillways are computed using stage-discharge relations.

For some gaging stations, there are periods when no gage-height record is obtained, or the recorded gage height is so faulty that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, the float is frozen in the well, or for various other reasons. For these periods, the daily discharges are estimated from the recorded range in stage, discharge computed before and after the missing record, discharge measurements, weather records, and comparison with other station records from the same or nearby basins. Likewise, daily contents may be estimated from operator's logs, previous or following record, inflow-outflow studies, and other information. Information explaining how estimated daily-discharge values are identified in station records is included in the next two sections, "Data Presentation" (REMARKS paragraph) and "Identifying Estimated Daily Discharge."

Data Presentation

The records published for each gaging station consist of two parts, the manuscript or station description and the data table for the current water year. The manuscript provides, under various headings, descriptive information, such as station location; period of record; average discharge; historical extremes; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations is obtained from the most accurate maps available. The location of the gage with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages were determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968, prepared by the Water Resources Council or were provided by the U.S. Army Corps of Engineers.

DRAINAGE AREA.--Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

PERIOD OF RECORD.--This indicates the period for which there are published records for the station or for an equivalent station. An equivalent station is one that was in operation at a time that the present station was not, and whose location was such that records from it can reasonably be considered equivalent with records from the present station.

REVISED RECORDS.--Published records, because of new information, occasionally are found to be incorrect, and revisions are printed in later reports. Listed under this heading are all the reports in which revisions have been published for the station and the water years to which the revisions apply. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted after the year dates as follows: "(M)" means that only the instantaneous maximum discharge was revised; "(m)" that only the instantaneous minimum was revised; and "(P)" that only peak discharges were revised. If the drainage area has been revised, the report in which the most recently revised figure was first published is given.

GAGE.--The type of gage in current use, the datum of the current gage referred to National Geodetic Vertical Datum of 1929 (see glossary), and a condensed history of the types, locations, and datums of previous gages are given under this heading.

REMARKS.--All periods of estimated daily-discharge record will either be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily-discharge table. (See next section, "Identifying Estimated Daily Discharge.") If a remarks statement is used to identify estimated record, the paragraph will begin with this information presented as the first entry. The paragraph is also used to present information relative to the accuracy of the records, to special methods of computation, to conditions that affect natural flow at the station and, possibly, to other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

AVERAGE DISCHARGE.--The discharge value given is the arithmetic mean of the water-year mean discharges. It is computed only for stations having at least 5 water years of complete record, and only water years of complete record are included in the computation. It is not computed for stations where diversions, storage, or other water-use practices cause the value to be meaningless. If water developments significantly altering flow at a station are put into use after the station has been in operation for a period of years, a new average is computed as soon as 5 water years of record have accumulated following the development. The median of yearly mean discharges also is given under this heading for stations having 10 or more water years of record, if the median differs from the average given by more than 10 percent.

EXTREMES FOR PERIOD OF RECORD.--Extremes may include maximum and minimum stages and maximum and minimum discharges or content. Unless otherwise qualified, the maximum discharge or content is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a graphic or digital recorder, a crest-stage gage, or by direct observation of a nonrecording gage. If the maximum stage did not occur on the same day as the maximum discharge or content, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the same manner as the maximum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Included here is information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the U.S. Geological Survey.

EXTREMES FOR CURRENT YEAR.--Extremes given here are similar to those for the period of record, except the peak discharge listing may include secondary peaks. For stations meeting certain criteria, all peak discharges and stages occurring during the water year and greater than a selected base discharge are presented under this heading. The peaks greater than the base discharge, excluding the highest one, are referred to as secondary peaks. Peak discharges are not published for canals, ditches, drains, or streams for which the peaks are subject to substantial control by man. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030, and 1:30 p.m. is 1330. The minimum for the current water year appears below the table of peak data.

REVISIONS.--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published to document the revision in a "Revised Records" entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the offices whose addresses are given on the back of the title page of this report to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published revision of data is always accompanied by revision of the corresponding data in computer storage.

Manuscript information for lake or reservoir stations differs from that for stream stations in the nature of the "Remarks" and in the inclusion of a skeleton stage-capacity table when daily contents are given.

The daily table for stream-gaging stations gives mean discharge for each day and is followed by monthly and yearly summaries. In the monthly summary below the daily table, the line headed "TOTAL" gives the sum of the daily figures. The line headed "MEAN" gives the average flow in cubic feet per second during the month. The lines headed "MAX" and "MIN" give the maximum and minimum daily discharges, respectively, for the month. Discharge for the month also is usually expressed in cubic feet per second per square mile (line headed "CFSM"), or in inches (line headed "IN."), or in acre-feet (line headed "AC-FT"). Figures for cubic feet per second per square mile and runoff in inches are omitted if there is extensive regulation or diversion or if the drainage area includes large noncontributing areas. In the yearly summary below the monthly summary, the figures shown are the appropriate discharges for the calendar and water years. At some stations monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversions or reservoir contents are given. These figures are identified by a symbol and corresponding footnote.

Data collected at partial-record stations follow the information for continuous-record sites. This section consists of a table of annual maximum stage and discharge for crest-stage stations.

Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual State data reports are identified by listing the dates of the estimated record in the REMARKS paragraph of the station description.

Accuracy of the Records

The accuracy of streamflow records depends primarily on: (1) The stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements; and (2) the accuracy of measurements of stage, measurements of discharge, and interpretation of records.

The accuracy attributed to the records is indicated under "REMARKS." "Excellent" means that about 95 percent of the daily discharges are within 5 percent of their true values; "good," within 10 percent; and "fair," within 15 percent. Records that do not meet the criteria mentioned are rated "poor." Different accuracies may be attributed to different parts of a given record.

Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft³/s the nearest tenth between 1.0 and 10 ft³/s; to whole numbers between 10 and 1,000 ft³/s; and to 3 significant figures for more than 1,000 ft³/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharges listed for partial-record stations and miscellaneous sites.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff due to the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, figures of cubic feet per second per square mile and of runoff, in inches, are not published.

Other Records Available

Information used in the preparation of the records in this publication, such as discharge-measurement notes, gage-height records, temperature measurements, and rating tables is on file in various field offices of the Iowa District. Also, most of the daily mean discharges are in computer-readable form and have been analyzed statistically. Information on the availability of the unpublished information or on the results of statistical analyses of the published records may be obtained from the offices whose addresses are given on the back of the title page of this report.

Records of Surface-Water Quality

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may involve a variety of types of data and measurement frequencies.

Classification of records

Water-quality data for surface-water sites are grouped into one of three classifications. A continuing-record station is a site where data are collected on a regularly scheduled basis. Frequency may be once or more times daily, weekly, monthly, or quarterly. A partial-record station is a site where limited water-quality data are collected systematically over a period of years. Frequency of sampling is usually less than quarterly. A miscellaneous sampling site is a location other than a continuing or partial-record station, where random samples are collected to give better areal coverage to define water-quality conditions in the river basin.

A careful distinction needs to be made between "continuing records" as used in this report and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this report are shown in figure 3.

Arrangement of Records

Water-quality records collected at a surface-water daily record station are published immediately following that record, regardless of the frequency of sample collection. Station number and name are the same for both records. Where a surface-water daily record station is not available or where the water quality differs significantly from that at the nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of discharge measurements at miscellaneous sites.

On-site measurements and sample collection

In obtaining water-quality data, a major concern needs to be assuring that the data obtained represent the in-situ quality of the water. To assure this, certain measurements, such as water temperature, pH, alkalinity and dissolved oxygen, are made onsite when the samples are taken. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures are followed in collecting the samples, in treating the samples to prevent changes in quality pending analysis, and in shipping the samples to the laboratory. Procedures of onsite measurements and for collecting, treating, and shipping samples are given in publications on "Techniques of Water-Resources Investigations," Book 1, Chap. C2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4. All of these references are listed on p. 57-58 of this report. Also, detailed information on collecting, treating, and shipping samples may be obtained from the Geological Survey District office.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled through several vertical sections to obtain the representative sample needed for an accurate mean concentration and for use in calculating load. All samples obtained for the National Stream Quality Accounting Network are obtained from at least several verticals. Whether samples are obtained from the centroid of flow or from several verticals, depends on flow conditions and other factors which must be evaluated by the collector.

Chemical-quality data published in this report are considered to be the most representative values available for stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis.

Water temperature and specific conductance

Water temperatures are measured at most of the water-quality stations. The measurement of temperature and specific conductance is performed during each regular site visit (usually at a six week interval) to stream-gaging stations. Records of stream temperature indicate significant thermal characteristics of the stream when analysed over a long period of record. Large streams have small daily temperature variations while shallow streams may have a daily range of several degrees and may closely follow the changes in air temperature. Furthermore, some streams may be affected by waste-heat discharge.

Specific conductance can be used as a general indicator of stream quality. This determination is easily made in the field with a portable meter, and the results are very useful as general indicators of dissolved-solids concentration or as a base for extrapolating other analytical data. Records for temperature and specific conductance appear in the section "Analyses of samples collected at miscellaneous sites".

Sediment

Suspended-sediment concentrations are determined from samples collected by using depth-integrating samples. Samples usually are obtained at several verticals in the cross section, or a single sample may be obtained at a fixed point and a coefficient applied to determine the mean concentration in the cross sections.

During periods of rapidly changing flow or rapidly changing concentration, samples may have been collected more frequently (twice daily or, in some instances, hourly). The published sediment discharges for days of rapidly changing flow or concentration were computed by the subdivided-day method (time-discharge weighted average). Therefore, for those days when the published sediment discharge value differs from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were collected, daily discharges of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge.

At other stations, suspended-sediment samples were collected periodically at many verticals in the stream cross section. Although data collected periodically may represent conditions only at the time of observations, such data are useful in establishing seasonal relations between quality and streamflow and in predicting long-term sediment-discharge characteristics of the stream.

In addition to the records of the quantities of suspended-sediment, records of the periodic measurements of the particle-size distribution of the suspended-sediment and bed material are included. Miscellaneous suspended-sediment samples were collected during flood events have been included with the station's water quality data or in the section "Analyses of samples at miscellaneous sites".

Laboratory measurements

Sediment samples, samples for indicator bacteria, and daily samples for specific conductance are analyzed locally. All other samples are analyzed in the U.S. Geological Survey laboratory in Arvada, Colorado and the University of Iowa Hygenic Laboratory. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chap. C1. Methods used by the U.S. Geological Survey laboratories are given in TWRI, Book 1, Chap. D2, Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4.

Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved oxygen, and suspended sediment then follow in sequence.

In the descriptive headings, if the location is identical to that of the discharge gaging station, neither the LOCATION nor the DRAINAGE AREA statements are repeated. The following information, as appropriate, is provided with each continuous-record station. Comments that follow clarify information presented under the various headings of the station description.

LOCATION.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

DRAINAGE AREA.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

PERIOD OF RECORD.--This indicates the periods for which there are published water-quality records for the station. The periods are shown separately for records of parameters measured daily or continuously and those measured less than daily. For those measured daily or continuously, periods of record are given for the parameters individually.

INSTRUMENTATION.--Information on instrumentation is given only if a water-quality monitor temperature record, sediment pumping sampler, or other sampling device is in operation at a station.

REMARKS.--Remarks provide added information pertinent to the collection, analysis, or computation of the records.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

EXTREMES.--Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums or minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISED.--If errors in published water-quality records are discovered after publication, appropriate updates are made to the Water-Quality File in the U.S. Geological Survey's computerized data system, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from the appropriate computer file to insure the most recent updates.

The surface-water-quality records for partial-record stations and miscellaneous sampling sites are published in separate tables following the table of discharge measurements at miscellaneous sites. No descriptive statements are given for these records. Each station is published with its own station number and name in the regular downstream-order sequence.

Remark Codes

The following remark codes may appear with the water-quality data in this report:

<u>PRINTED OUTPUT</u>	<u>REMARK</u>
E	Estimated value
>	Actual value is known to be greater than the value shown
<	Actual value is known to be less than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)
L	Biological organism count less than 0.5 percent (organism may be observed rather than counted)
D	Biological organism count equal to or greater than 15 percent (dominant)
&	Biological organism estimated as dominant

Records of Ground-Water Levels

Ground-water level data from a network of observation wells in Iowa are published in this report. These data provide a limited historical record of water-level changes in the State's most important aquifers. Locations of the observation wells in this network in Iowa are shown in figure 5. Information about the availability of the data in the water-level files and reports of the U.S. Geological Survey may be obtained from the Iowa District Office (see address on back of title page).

Data Collection and Computation

Measurements of water levels are made in many types of wells under varying conditions, but the methods of measurement are standardized to the extent possible. The equipment and measuring techniques used at each observation well ensures that measurements at each well are of consistent accuracy and reliability.

Tables of water-level data are arranged alphabetically by counties. The site identification number, based on latitude and longitude, for a given well is the 15-digit numeric value that appears in the upper left corner of the station description. The secondary identification number is the local well number, an alphanumeric value, derived from the township, range, and section location of the well (fig. 14).

Water-level records are obtained from direct measurements with a chalked steel tape, electric line, airline, or from the graph of a water-level recorder. The water-level measurements in this report are in feet with reference to land-surface datum. Land-surface datum is a plane that is approximately at land surface at each well. The elevation of the land-surface datum is given in the well description. The height of the measuring point above or below land-surface datum is given in each well description. Water levels in wells equipped with recording gages are reported for every fifth day and the end of each month (EOM).

Water-level measurements are reported to the nearest hundredth of a foot. Estimates, indicated by an "e" may be reported in tenths of a foot. Adjustments to the water level recorder chart are indicated by an "a". The error of water-level measurements may be, at most, a few hundredths of a foot.

Data Presentation

Each well record consists of two parts, the station description and the table of water levels observed during the water year. The description of the well is presented by headings preceding the tabular data. The following explains the information presented under each heading.

LOCATION.--This paragraph follows the well identification number and includes the latitude and longitude (given in degrees, minutes, and seconds), the hydrologic unit number, the distance and direction from a geographic point of reference, and the well owner's name.

AQUIFER.--This entry is the aquifer(s) name (if one exists) and geologic age of the strata open to the well.

WELL CHARACTERISTICS.--This entry describes the well depth, casing diameter, casing depth, opening or screened interval(s), method of construction, and use of water from the well.

INSTRUMENTATION.--This paragraph provides information on the frequency of measurement and the collection method used.

DATUM.--This entry includes the measuring point and the land-surface elevation at the well. The measuring point is described physically and in relation to land surface. The elevation of the land-surface datum is in feet above National Geodetic Vertical Datum of 1929 and its precision is dependent on the method of determination.

REMARKS.--This entry describes factors that may influence the water level in a well or the measurement of the water level and any information not presented in the other parts of the station description but considered useful.

PERIOD OF RECORD.--This entry indicates the period for which there are published records for the well. It reports the month and year of the beginning of publication of water-level records by the U.S. Geological Survey.

REVISED RECORDS.--If any revisions of previously published data were made for water-levels, the Water Data Report in which they appeared and year published would appear here.

EXTREMES FOR PERIOD OF RECORD.--This entry contains the highest and lowest water levels for the period of record, below land-surface datum, and the dates of their occurrence.

A table of water levels follows the station description for each well. Water levels are reported in feet below land-surface datum. For wells equipped with recorders, only abbreviated tables are published. The highest and lowest water levels of the water year and the dates of occurrence are shown on a line below the abbreviated table. Because all values are not published for wells with recorders, the extremes may be values that are not listed in the table. Missing records are indicated by dashes in place of the water level.

Hydrographs are included for 74 wells which are representative of hydrologic conditions in the important aquifers in Iowa.

Only water-level data from a national network of observation wells are given in this report. These data are intended to provide a sampling and historical record of water-level changes in the Nation's most important aquifers. Locations of the observation wells in this network in Iowa are shown in figure 5.

Records of Ground-Water Quality

Records of ground-water quality in this report differ from other types of records in that for most sampling sites they consist of only one set of measurements for the water year. The quality of ground water ordinarily changes only slowly; therefore, for most general purposes one annual sampling, or only a few samples taken at infrequent intervals during the year, is sufficient. Frequent measurement of the same constituents is not necessary unless one is concerned with a particular problem, such as monitoring for trends in nitrate concentration. In the special cases where the quality of ground water may change more rapidly, more frequent measurements are made to identify the nature of the changes.

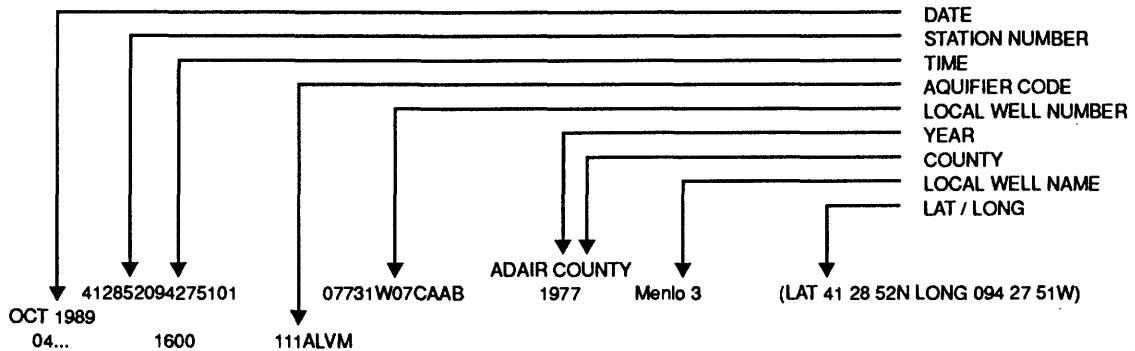
The records of ground-water quality in this report were obtained as a part of a statewide ground-water quality monitoring network operated by the Iowa District. All samples were obtained from municipal wells throughout Iowa. This program is conducted in cooperation with the University of Iowa Hygienic Laboratory (UHL) and the Iowa Geological Survey. All samples are collected by USGS personnel, field-preserved and submitted to UHL for analysis. Chemical analyses include common constituents (major ions), nutrients, trace metals, radionuclides and pesticides. Approximately 10 percent of the samples receive additional analyses for about 90 organic priority pollutants, however these analyses are not presented in this report but are on file in the District office.

Most methods for collecting and analyzing water samples are described in the "U.S. Geological Survey Techniques of Water-Resources Investigations" manuals listed on a following page. The values reported in this report represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. All samples were obtained by trained personnel. The wells sampled were pumped long enough to assure that the water collected came directly from the aquifer and had not stood for a long time in the well casing where it would have been exposed to the atmosphere and to the material, possible metal, comprising the casings. The samples collected represent raw water.

Data Presentation

The records of ground-water quality are published in a section titled GROUND-WATER QUALITY DATA immediately following the ground-water-level records. Data for quality of ground water are listed alphabetically by County, and are identified by station number. The prime identification number for wells sampled is the 15-digit station number derived from the latitude-longitude locations. No descriptive statements are given for ground-water-quality records; however, the station number, date and time of sampling, depth of well, and other pertinent data are given in the table containing the chemical analyses of the ground water. The REMARK codes listed for surface-water-quality records are also applicable to ground-water-quality records.

Explanation of ground-water-quality data tables -- descriptive headings;



DATE: Date the well was sampled.

STATION: 15-digit number based on grid system of latitude and NUMBER longitude.

TIME: Time the sample was collected.

AQUIFER: Refers to the lithologic unit in which the well is completed.
 CODE Derived from two digits of the GEOLOGIC UNIT, the principal unit which is providing the majority of water to the well.

11	= Quaternary	34	= Devonian
21	= Cretaceous	35	= Silurian
32	= Pennsylvanian	36	= Ordovician
33	= Mississippian	37	= Cambrian

Third digit and remaining alphabetic characters refer to the more specific lithologic unit which the well is tapping. The following examples are commonly used units:

<u>CODE</u>	<u>General</u>	<u>Specific</u>
111ALVM	Quaternary	(alluvium)
217DKOT	Cretaceous	(Dakota sandstone)
344CDVL	Devonian	(Cedar Valley limestone)

LOCAL WELL: Refers to the Bureau of Land Management System of land subdivision

COUNTY: The name of the county where the well is located.

DATE OF CONSTRUCTION: The date the well construction was completed.

LOCAL WELL NAME: Name used by community to identify well.

LAT/LONG: Latitude and longitude location of well.

ACCESS TO WATSTORE DATA

The National WATer Data STOrage and REtrieval System (WATSTORE) was established for handling water data collected through the activities of the U.S. Geological Survey and to provide for more effective and efficient means of releasing the data to the public. The system is operated and maintained on the central computer facilities of the Survey at its National Center in Reston, Virginia.

WATSTORE can provide a variety of useful products ranging from simple data tables to complex statistical analyses. A minimal fee, plus the actual computer cost incurred in producing a desired product, is charged to the requester. Information about the availability of specific types of data, the acquisition of data or products, and user charges can be obtained locally from the offices whose addresses are given on the back of the title page.

General inquiries about WATSTORE may be directed to:

Chief Hydrologist
U.S. Geological Survey
437 National Center
Reston, Virginia 22092

DEFINITION OF TERMS

Terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. See also table for converting English units to International System (SI) Units on the inside of the back cover.

Acre-foot (AC-FT, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Aquifer is a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Artesian means confined and is used to describe a well in which the water level stands above the top of the aquifer tapped by the well. A flowing artesian well is one in which the water level is above the land surface.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Fecal coliform bacteria are bacteria that are present in the intestine or feces of warm-blooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all organisms that produce blue colonies within 24 hours when incubated at 44.5°C plus or minus 0.2°C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal streptococcal bacteria are bacteria found also in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as Gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at 35°C plus or minus 1.0°C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Bed material is the sediment mixture of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

Bottom material: See Bed material.

Cubic-foot-per-second day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, approximately 1.9835 acre-feet, about 646,000 gallons, or 2,445 cubic meters.

Contents is the volume of water in a reservoir or lake. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, an artificial structure, or a uniform cross section over a long reach of the channel.

Control structure as used in this report is a structure on a stream or canal that is used to regulate the flow or stage of the stream or to prevent the intrusion of salt water.

Cubic foot per second (ft^3/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

Cubic feet per second per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment) that passes a given point within a given period of time.

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period.

Instantaneous discharge is the discharge at a particular instant of time.

Dissolved refers to that material in a representative water sample which passes through a 0.45 um membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

Dissolved-solids concentration of water is determined either analytically by the "residue-on-evaporation" method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination of dissolved solids, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. Therefore, in the mathematical calculation of dissolved-solids concentration, the bicarbonate value, in milligrams per liter, is multiplied by 0.492 to reflect the change.

Drainage area of a stream at a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the stream above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise specified.

Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

Gage height (G.H.) is the water-surface elevation referred to some arbitrary gage datum. Gage height is often used interchangeably with the more general term "stage," although gage height is more appropriate when used with a reading on a gage.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations and is expressed as the equivalent concentration of calcium carbonate (CaCO_3).

Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an eight-digit number.

Land-surface datum (lsd) is a datum plane that is approximately at land surface at each ground-water observation well.

Measuring point (MP) is an arbitrary permanent reference point from which the distance to the water surface in a well is measured to obtain the water level.

Micrograms per gram (ug/g) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the element per unit mass (gram) of material analyzed.

Micrograms per liter (UG/L, ug/L) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

Milligrams per liter (MG/L, mg/L) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represents the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in mg/L and is based on the mass of dry sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD of 1929) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level Datum of 1929" or "mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Parameter Code is a 5-digit number used in the U.S. Geological Survey computerized data system, WATSTORE, to uniquely identify a specific constituent. The codes used in WATSTORE are the same as those used in the U.S. Environmental Protection Agency data system, STORET. The Environmental Protection Agency assigns and approves all requests for new codes.

Partial-record station is a particular site where limited streamflow and/or water-quality data are collected systematically over a period of years for use in hydrologic analyses.

Particle size is the diameter, in millimeters (mm), of a particle determined by either sieve or sedimentation methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

Particle-size classification used in this report agrees with the recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

<u>Classification</u>	<u>Size (mm)</u>	<u>Method of analysis</u>
Clay.....	0.00024 - 0.004	Sedimentation
Silt.....	.004 - .062	Sedimentation
Sand.....	.062 - 2.0	Sedimentation or sieve
Gravel.....	2.0 - 64.0	Sieve

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. Most of the organic matter is removed, and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water. Chemical dispersion is not used for native-water analysis.

Pesticides are chemical compounds used to control undesirable organisms. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides.

Picocurie (PC, pCi) is one trillionth (1×10^{-12}) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7×10^{10} radioactive disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

Radiochemical program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Recoverable from bottom material is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Return period is the average time interval between occurrences of a hydrological event of a given or greater magnitude, usually expressed in years. May also be called recurrence interval.

Runoff in inches (IN., in.) shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

Bed load is the sediment that is transported in a stream by rolling, sliding, or skipping along the bed and very close to it. In this report, bed load is considered to consist of particles in transit within 0.25 ft of the streambed.

Bed load discharge (tons per day) is the quantity of bed load measured by dry weight that moves past a section as bed load in a given time.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

Mean concentration is the time-weighted concentration of suspended sediment passing a stream section during a 24-hour day.

Suspended-sediment discharge (tons/day) is the rate at which dry mass of sediment passes a section of a stream or is the quantity of sediment, as measured by dry mass or volume, that passes a section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L) x discharge ft³/s x 0.0027.

Suspended-sediment load is a general term that refers to material in suspension. It is not synonymous with either discharge or concentration.

Total sediment discharge (tons/day) is the sum of the suspended-sediment discharge and the bed-load discharge. It is the total quantity of sediment, as measured by dry mass or volume, that passes a section during a given time.

Total-sediment load or total load is a term which refers to the total sediment (bed load plus suspended-sediment load) that is in transport. It is not synonymous with total-sediment discharge.

7-day 10-year low flow (7 Q₁₀) is the discharge at the 10-year recurrence interval taken from a frequency curve of annual values of the lowest mean discharge for 7 consecutive days (the 7-day low flow).

Sodium-adsorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Solute is any substance that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25° C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65-percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stage-discharge relation is the relation between gage height (stage) and volume of water, per unit of time, flowing in a channel.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Surface area of a lake is that area outlined on the latest U.S.G.S. topographic map as the boundary of the lake and measured by a planimeter in acres. In localities not covered by topographic maps, the areas are computed from the best maps available at the time planimetered. All areas shown are those for the stage when the planimetered map was made.

Surficial bed material is the part (0.1 to 0.2 ft) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is associated with the material retained on a 0.45-micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45 um membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the "total" amount (that is, less than 95-percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Determinations of "suspended, recoverable" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45 um membrane filter. This term is used only when the analytical procedure assures measurement of at least 95-percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total."

Determinations of "suspended, total" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table headings and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Tons per acre-foot indicates the dry mass of dissolved solids in 1 acre-foot of water. It is computed by multiplying the concentration of the constituent, in milligrams per liter, by 0.00136.

Tons per day (T/DAY) is the quantity of a substance in solution or suspension that passes a stream section during a 24-hour period.

Total is the total amount of a given constituent in a representative water-suspended sediment sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95-percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determined all of the constituent in the sample.)

Total discharge is the total quantity of any individual constituent, as measured by dry mass or volume, that passes through a stream cross-section per unit of time. This term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

Total, recoverable is the amount of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that is, less than 95-percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Tritium Network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

Water year in U.S. Geological Survey reports dealing with surface-water supply is the 12-month period October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1990, is called the "1990 water year."

WDR is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual hydrologic-data reports (WRD was used as an abbreviation for "Water-Resources Data" in reports published prior to 1976).

Weighted average is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

WSP is used as an abbreviation for "Water-Supply Paper" in reference to previously published reports.

PUBLICATION OF TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The U.S. Geological Survey publishes a series of manuals describing procedures for planning and conducting specialized work in water-resources investigations. The material is grouped under major subject headings called books and is further divided into sections and chapters. For example, Section A of Book 3 (Applications of Hydraulics) pertains to surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises.

The reports listed below are for sale by the U.S. Geological Survey, Books and Open-File Reports Section, Federal Center, Box 25425, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. Current prices can be obtained by writing to the above address. When ordering or inquiring about prices for any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations."

- 1-D1. *Water temperature--influential factors, field measurement, and data presentation*, by H. H. Stevens, Jr., J. F. Fliske, and G. F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.
- 1-D2. *Guidelines for collection and field analysis of ground-water samples for selected unstable constituents*, by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.
- 2-D1. *Application of surface geophysics to ground-water investigations*, by A. A. R. Zohdy, G. P. Eaton, and D. R. Mabey: USGS--TWRI Book 2, Chapter D1. 1974. 116 pages.
- 2-D2. *Application of seismic-refraction techniques to hydrologic studies*, by F. P. Haeni: USGS--TWRI Book 2, Chapter D2. 1988. 86 pages.
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- 3-A10. *Discharge ratings at gaging stations*, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A10. 1984. 59 pages.
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- 3-A13. *Computation of continuous records of streamflow*, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A13. 1983. 53 pages.
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DISCONTINUED GAGING STATIONS

The following stream-gaging stations have been discontinued in Iowa. Continuous daily streamflow records were collected and published for the period of record shown for each station.

Discontinued gaging stations

Station name	Station number	Drainage area (sq mi)	Period of record
Upper Iowa River at Decorah, Iowa	05387500	511	1952-83
Upper Iowa River near Decorah, Iowa	05388000	568	1919-27; 1933-51
Paint Creek at Waterville, Iowa	05388500	42.8	1952-73
Yellow River at Ion, Iowa	05389000	221	1934-51
Mississippi River at Clayton, Iowa	05411500	9,200	1930-36
Turkey River at Elkader, Iowa	05412000	891	1932-42
Little Maquoketa River near Durango, Iowa	05414500	130	1934-82
Maquoketa River near Manchester, Iowa	05417000	305	1933-73
Maquoketa River near Delhi, Iowa	05417500	347	1933-40
Bear Creek near Monmouth, Iowa	05417700	61.3	1957-76
Maquoketa River above North Fork Maquoketa River near Maquoketa, Iowa	05418000	938	1913-14
Wapsipinicon River at Stone City, Iowa	05421500	1,324	1903-14
Crow Creek at Eldridge, Iowa	05422420	2.20	1977-82
Crow Creek at Mt. Joy, Iowa	05422450	6.90	1977-82
Pine Creek at Muscatine, Iowa	05448150	38.9	1975-82
Eagle Lake inlet near Britt, Iowa	05448285	3.83	1975-80
Eagle Lake outlet near Britt, Iowa	05448290	11.3	1975-80
West Branch (West Fork) Iowa River near Klemme, Iowa	05448500	112	1948-58
Iowa River near Iowa Falls, Iowa	05450000	665	1911-14
Upper Pine Lake at Eldora, Iowa	05450500	14.9	1936-70
Lower Pine Lake at Eldora, Iowa	05451000	15.9	1936-70
Iowa River near Belle Plaine, Iowa	05452500	2,455	1939-59
Lake Macbride near Solon, Iowa	05453500	27.0	1936-71
Ralston Creek at Iowa City, Iowa	05455000	3.01	1924-87
Cedar River at Mitchell, Iowa	05457500	826	1933-42
Shell Rock River near Northwood, Iowa	05459000	300	1945-86
Shell Rock River at Marble Rock (Greene), Iowa	05460500	1,318	1933-53
Shell Rock River at Greene, Iowa	05461000	1,357	1933-42
Shell Rock River near Clarksville, Iowa	05461500	1,626	1915-27; 1932-34
Fourmile Creek near Lincoln, Iowa	05464130	13.78	1962-67; 1969-74
Half Mile Creek near Gladbrook, Iowa	05464133	1.33	1962-67; 1969-74
Fourmile Creek near Traer, Iowa	05464137	19.51	1962-74; 1975-80
Prairie Creek at Fairfax, Iowa	05464640	178	1966-82
South Skunk River below Squaw Creek near Ames, Iowa	05471000	556	1952-79
Lake Keomah near Oskaloosa, Iowa	05472000	3.06	1936-71
Skunk River at Coppock, Iowa	05473000	2,916	1913-44
Big Creek near Mount Pleasant, Iowa	05473500	106	1955-79
East Fork Des Moines River near Burt, Iowa	05478000	462	1971-74
East Fork Des Moines River near Hardy, Iowa	05478500	1,268	1940-54
Des Moines River near Fort Dodge, Iowa	05479500	3,753	1911-13
Lizard Creek near Clare, Iowa	05480000	257	1940-82
Des Moines River near Boone, Iowa	05481500	5,511	1920-68
Des Moines River at Des Moines, Iowa	05482000	6,245	1905-06; 1915-61
Storm Lake at Storm Lake, Iowa	05482140	28.3	1970-75
Springbrook Lake near Guthrie Center, Iowa	05483500	5.18	1936-71
Raccoon River at Des Moines, Iowa	05485000	3,590	1902-03
Lake Ahquabi near Indianola, Iowa	05487000	4.93	1936-71
White Breast Creek near Knoxville, Iowa	05488000	380	1945-62
Muchakinock Creek near Eddyville, Iowa	05489190	70.2	1975-79
Lake Wapello near Drakesville, Iowa	05490000	7.75	1936-71
Sugar Creek near Keokuk, Iowa	05491000	105	1922-31; 1958-73
Fox River at Bloomfield, Iowa	05494300	87.7	1957-73
Fox River at Cantril, Iowa	05494500	161	1940-51
Rock River at Rock Rapids, Iowa	06483270	788	1959-74
Dry Creek at Hawarden, Iowa	06484000	48.4	1948-69
West Fork ditch at Holly Springs, Iowa	06602000	399	1939-69
Loon Creek near Orleans, Iowa	06603920	31	1971-74
Spirit Lake outlet at Orleans, Iowa	06604100	75.6	1971-74
Milford Creek at Milford, Iowa	06604400	146	1971-74
Little Sioux River at Spencer, Iowa	06605100	990	1936-42
Little Sioux River at Gillett Grove, Iowa	06605600	1,334	1958-73
Little Sioux River near Kennebeck, Iowa	06606700	2,738	1939-69
Odebolt Creek near Arthur, Iowa	06607000	39.3	1957-75
Maple River at Turin, Iowa	06607300	725	1939-41
Little Sioux River near Blencoe (Turin), Iowa	06607510	4,470	1939-42
Steer Creek near Magnolia, Iowa	06609200	9.26	1963-69
Thompson Creek near Woodbine, Iowa	06609590	6.97	1963-69
Willow Creek near Logan, Iowa	06609600	129	1972-75
Indian Creek at Council Bluffs, Iowa	06610500	7.99	1954-76
Mosquito Creek near Earling, Iowa	06610520	32.0	1965-79
Waubonsie Creek near Bartlett, Iowa	06806000	30.4	1946-69
West Nishnabotna River at Harlan, Iowa	06807320	316	1977-82
West Nishnabotna River at (near) White Cloud, Iowa	06807500	967	1918-24
Mule Creek near Malvern, Iowa	06808000	10.6	1954-69
Spring Valley Creek near Tabor, Iowa	06808200	7.6	1955-64
Davids Creek near Hamlin, Iowa	06809000	26.0	1952-73
Tarkio river at Blanchard, Iowa	06812000	200	1934-40
West Nodaway River at Villisca, Iowa	06816500	342	1918-25
Honey Creek near Russell, Iowa	06903500	13.2	1952-62
Chariton River near Centerville, Iowa	06904000	708	1938-59

WATER RESOURCES DATA - IOWA, 1990

DISCONTINUED WATER-QUALITY STATIONS

The following water-quality stations have been discontinued in Iowa. Continuous daily records of water temperature or sediment and monthly or periodic samples of chemical quality were collected and published for the period of record shown for each station. An asterisk (*) in the type of record column indicates that periodic data is available for that parameter subsequent to the period of daily record.

Discontinued water-quality stations

Station name	Station number	Drainage area (sq mi)	Type of Record	Period of record
Upper Iowa River at Decorah, Iowa	05387500	511	Sed., Temp.	1963-1983
Upper Iowa River near Dorchester, Iowa	05388250	770	Sed., Temp.	1975-81
Paint Creek at Waterville, Iowa	05388500	42.8	Temp. Sed.	1952-56 1952-57
Turkey River at Garber, Iowa	05412500	1,545	Temp., Sed.*	1957-62
Mississippi River at Dubuque, Iowa	05414700	1,600	Chem.	1969-73
Maquoketa River near Maquoketa, Iowa	05418500	1,553	Chem., Temp., Sed.	1978-82
Mississippi River at Clinton, Iowa	05420500	85,600	Chem.	1973-87
Wapsipinicon River at Independence, Iowa	05421000	1,048	Chem.* Temp.*, Sed.*	1968-70 1967-70
Crow Creek at Bettendorf, Iowa	05422470	17.8	Chem., Temp., Sed.	1978-82
Iowa River near Rowan, Iowa	05449500	429	Temp.*, Sed.*	1957-62
Cedar River near Gilbertville, Iowa	05464020	5,234	Chem.	1971; 1975-81
Iowa River at Iowa City, Iowa	05454500	3,271	Chem., Temp., Sed.	1952-1987
Ralston Creek at Iowa City, Iowa	05455000	3.01	Chem., Temp., Sed.	1906-1907; 1944-88
Fourmile Creek near Lincoln, Iowa	05464130	13.78	Chem., Temp., Sed.	1969-74
Half Mile Creek near Gladbrook, Iowa	05464133	1.33	Chem., Temp., Sed.	1969-74
Fourmile Creek near Traer, Iowa	05464137	19.51	Chem., Temp., Sed.	1969-74
Cedar River near Palo, Iowa	05464450	6,380	Chem.	1975-79
Cedar River at Cedar Rapids, Iowa	05464500	6,640	Chem.* Temp.* Sed.	1906-07; 1944-54 1944-54 1943-54
Cedar River near Bertram, Iowa	05464760	6,955	Chem.	1975-81
Mississippi River at Burlington, Iowa	05469720	4,000	Chem.	1969-73
Mississippi River at Keokuk, Iowa	05474500	119,000	Chem.	1974-87
Des Moines River at Fort Dodge, Iowa	05480500	4,190	Chem.	1972-73
Des Moines River at Des Moines, Iowa	05482000	6,245	Chem. Temp., Sed.	1954-55 1954-61
E. Fork Hardin Creek near Churdan, Iowa	05483000	24.0	Temp.*, Sed.*	1952-57
M. Fork Raccoon River near Bayard, Iowa	05483450	375	Chem., Temp., Sed.	1979-85
M. Fork Raccoon River at Panora, Iowa	05483600	440	Chem., Temp., Sed.	1979-85
Raccoon River at Des Moines, Iowa	05485000	3,590	Chem., Temp.	1945-47
Des Moines River below Raccoon River at Des Moines, Iowa	05485500	9,770	Chem.* Temp.*, Sed.	1944-45 1944-47
Des Moines River below Des Moines, Iowa	05485520	9,901	Chem.	1971; 1975-81
Middle River near Indianola, Iowa	05486490	503	Temp.*, Sed.	1962-67
White Breast Creek near Dallas, Iowa	05487980	342	Chem. Temp., Sed.	1968-73 1967-73
Big Sioux River at Sioux City, Iowa	06485950	9,410	Chem.	1969-73
Missouri River at Sioux City, Iowa	06486000	314,600	Chem.	1972-86
Floyd River at James, Iowa	06600500	882	Temp., Sed.	1968-73
Floyd River at Sioux City, Iowa	06600520	921	Chem.	1969-73
Missouri River at Decatur, Nebr.	06601200	316,160	Chem.	1974-81
Little Sioux River at Correctionville, Iowa	06606600	2,500	Chem.* Temp.* Sed.	1954-55 1951-62 1950-62
Little Sioux River near Kennebec, Iowa	06606700	2,738	Temp. Sed.	1950-55 1950-57
Little Sioux River at River Sioux, Iowa	06607513	3,600	Chem.	1969-73
Soldier River near Mondamin, Iowa	06608505	440	Chem.	1970-73
Steer Creek near Magnolia, Iowa	06609200	9.26	Temp., Sed.	1963-69
Thompson Creek near Woodbine, Iowa	06609590	6.97	Temp., Sed.	1963-69
Willow Creek near Logan, Iowa	06609600	129	Chem., Temp. Sed.	1972-75 1971-75
Missouri River at Omaha, Nebr.	06610000	322,800	Chem.	1969-86
Mule Creek near Malvern, Iowa	06808000	10.6	Temp. Sed.	1958-69 1954-69
Davids Creek near Hamlin, Iowa	06809000	26.0	Temp.*	1952-53; 1965-68
East Nishnabotna River at Red Oak, Iowa	06809500	894	Temp., Sed.	1962-73
Platte River near Diagonal, Iowa	06818750	217	Chem.	1969-73
Thompson River at Davis City, Iowa	06898000	701	Chem. Temp., Sed.	1967-73 1968-73
Weldon River near Leon, Iowa	06898400	104	Chem.	1968-73
Chariton River near Chariton, Iowa	06903400	182	Temp., Sed.	1969-73
Honey Creek near Russell, Iowa	06903500	13.2	Sed.	1952-62
Chariton River near Rathbun, Iowa	06903900	551	Temp.*, Sed.*	1962-69

Type of record: Chem. (chemical quality); Temp. (water temperature); Sed. (sediment).

MISSISSIPPI RIVER BASIN

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UPPER IOWA RIVER BASIN

05388250 UPPER IOWA RIVER NEAR DORCHESTER, IA

LOCATION.--Lat 43°25'16", long 91°30'31", in SW1/4 NW1/4 sec.1, T.99 N., R.6 W., Allamakee County, Hydrologic Unit 07060002, on right bank at upstream side of bridge on State Highway 76, 650 ft upstream from Mineral Creek, 0.5 mi upstream from Bear Creek, 3.5 mi south of Dorchester, and 18.1 mi upstream from mouth.

DRAINAGE AREA.--770 mi².

PERIOD OF RECORD.--September 1936 to June 1975 (gage heights and discharge measurements only), July 1975 to current year.

GAGE.--Water-stage recorder. Datum of gage is 660.00 ft above NGVD. Prior to Jan. 6, 1938, nonrecording gage on old bridge at site 0.2 mi upstream at datum 5.91 ft higher. Jan. 6, 1938, to Apr. 26, 1948, nonrecording gage at datum 60.00 ft lower, Apr. 27, 1948 to August 1963, nonrecording gage on old bridge and August 1963 to June 1975 nonrecording gage on new bridge at same datum.

REMARKS.--Estimated daily discharges: Nov. 18 to Mar. 8 and June 19-29. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Geological Survey gage-height telemeter and U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--15 years, (water years 1976-90) 547 ft³/s, 9.65 in/yr, 396,300 acre-ft/yr; median of yearly mean discharges, 493 ft³/s, 8.7 in/yr, 357,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,000 ft³/s Mar. 12, 1976, gage height, 17.67 ft; minimum daily discharge, 79 ft³/s Dec. 31, 1976.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 30, 1941, reached a stage of 21.8 ft, from flood profile, discharge, 30,400 ft³/s on basis of slope-area determination of peak flow.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 8	2200	4,600	(a) 12.46	Aug. 26	(b) 0600	*7,990	(c)*14.60
Mar. 15	1315	4,780	12.59				

(a) ice jam

(b) about

(c) from HWM

Minimum daily discharge, 83 ft³/s Dec. 23.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	113	137	110	122	125	148	293	505	410	1080	487	1250
2	111	135	100	130	120	190	287	440	395	864	427	1110
3	106	132	94	135	115	250	276	394	420	738	395	998
4	106	133	108	124	120	350	271	365	455	650	837	925
5	116	138	120	124	130	290	262	345	405	573	2400	849
6	119	141	110	130	140	250	251	323	386	517	1690	776
7	113	141	103	140	152	240	247	307	368	486	1100	719
8	110	141	100	155	180	1000	243	290	360	473	817	687
9	108	140	104	170	220	3210	243	317	347	440	672	640
10	109	138	109	180	200	1580	265	359	323	414	615	613
11	110	138	106	178	250	2400	256	374	299	399	692	572
12	111	136	100	168	315	2630	253	408	290	391	509	545
13	109	136	105	155	350	1760	260	431	436	381	444	520
14	109	136	100	150	300	3030	266	414	724	364	400	512
15	112	136	98	150	250	3540	261	393	624	353	371	508
16	123	132	95	160	200	2850	256	391	560	344	348	476
17	123	116	93	215	175	1650	255	382	536	332	336	451
18	115	93	90	260	160	1110	246	375	565	322	329	441
19	118	108	89	240	160	843	248	422	1100	330	522	480
20	120	130	87	220	170	689	253	568	1700	467	956	467
21	119	129	85	190	165	599	245	863	1550	406	1720	439
22	118	120	84	170	175	544	241	942	1820	387	1520	417
23	118	100	83	155	165	484	239	798	2500	374	1010	404
24	117	98	85	145	155	431	235	705	2250	349	892	391
25	117	108	90	140	148	402	229	655	1950	332	3220	386
26	117	110	95	128	148	377	232	606	1700	314	6790	371
27	118	115	100	130	150	357	366	566	2000	320	5720	344
28	118	120	108	132	155	339	358	555	1700	352	2650	337
29	118	115	118	126	---	323	353	519	1500	582	2000	325
30	128	110	115	125	---	308	468	469	1320	595	1650	322
31	140	--	113	120	---	296	---	433	--	551	1420	--
TOTAL	3589	3762	3097	4867	5093	32470	8158	14914	28993	14480	42939	17275
MEAN	116	125	99.9	157	182	1047	272	481	966	467	1385	576
MAX	140	141	120	260	350	3540	468	942	2500	1080	6790	1250
MIN	106	93	83	120	115	148	229	290	314	329	322	
AC-FT	7120	7460	6140	9650	10100	64400	16180	29580	57510	28720	85170	34260
CFSM	.15	.16	.13	.20	.24	1.36	.35	.62	1.26	.61	1.80	.75
IN.	.17	.18	.15	.24	.25	1.57	.39	.72	1.40	.70	2.07	.83

CAL YR 1989	TOTAL 75028	MEAN 206	MAX 3460	MIN 80	AC-FT 148800	CFSM .27	IN. 3.62
WTR YR 1990	TOTAL 179637	MEAN 492	MAX 6790	MIN 83	AC-FT 356300	CFSM .64	IN. 8.68

MISSISSIPPI RIVER MAIN STEM

05389500 MISSISSIPPI RIVER AT MCGREGOR, IA

LOCATION.--Lat 43°01'29", long 91°10'21", in SE1/4 SE1/4 sec.22, T.95 N., R.3 W., Clayton County, Hydrologic Unit 07060001, on right bank in city park at east end of Main Street in McGregor, 2.6 mi upstream from Wisconsin River, 4.3 mi downstream from Yellow River, and at mile 633.4 upstream from Ohio River.

DRAINAGE AREA.--67,500 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1936 to current year.

REVISED RECORDS.--WDR IA-75-1: 1974.

GAGE.--Water-stage recorder. Datum of gage is 604.84 ft above NGVD. Prior to June 1, 1937, and since June 2, 1939, auxiliary water-stage recorder; June 1, 1937 to June 1, 1939, auxiliary nonrecording gage 14.1 mi upstream in tailwater of dam 9, at datum 5.30 ft lower.

REMARKS.--Estimated daily discharges: Nov. 21 to Mar. 8, and July 30 to Aug. 2. Records good except those for estimated daily discharges and for discharges less than 10,000 ft³/s, which are fair. Stage-discharge relation affected by backwater from Wisconsin River and Lock and Dam No. 10. Minor flow regulation caused by navigation dams. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--54 years, 35,200 ft³/s, 7.08 in/yr, 25,500,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 276,000 ft³/s Apr. 24, 1965; maximum gage height, 25.38 ft Apr. 24, 1965; minimum daily discharge, 6,200 ft³/s Dec. 9, 1936; minimum gage height, -0.86 ft Aug. 18, 1936.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1828, that of Apr. 24, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 98,800 ft³/s Mar. 20; maximum gage height, 14.17 ft June 21; minimum daily discharge, 10,300 ft³/s Dec 23, 24; minimum gage height, 5.48 ft Mar. 7, 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16700	17400	14100	11000	12600	12300	33600	48100	37000	75100	46400	42500
2	16100	17500	16000	11300	12600	12400	31900	47300	36300	76500	48200	42000
3	16100	17300	16900	11400	12500	12700	31400	46900	37000	75900	48400	40000
4	15800	17100	15300	11600	12300	12700	29400	48000	38100	72800	48400	34400
5	15600	17100	14900	11700	12400	13100	26300	49900	38400	65200	48100	25100
6	14700	17800	15400	11700	12500	13200	23300	51000	39800	56200	46800	21100
7	14800	19200	14900	11800	12400	13300	22200	50800	40800	48100	44400	17300
8	14800	20600	13800	11800	12400	14000	22800	49500	42300	45500	43200	17700
9	15300	20400	12900	14400	12500	17400	25900	49300	44600	45100	40200	22600
10	14500	20200	12500	14200	12500	20200	29000	50500	45700	45800	38200	27500
11	15500	19900	12200	14100	12400	24200	30100	47200	45900	46100	34500	29100
12	13900	19300	11900	14100	12200	33400	29600	45200	45700	45100	29400	30100
13	13700	18700	11900	12400	12900	44600	28100	44000	46800	40900	24500	31900
14	13600	18000	11800	12600	12700	55400	26600	43100	49700	37900	22300	32300
15	14100	17400	11800	12700	12400	66100	25100	44000	52600	35400	17800	32500
16	14300	17700	11800	12900	12900	81400	24700	45600	61100	33800	17100	31900
17	16000	17100	11400	13400	13300	90500	23000	45900	71500	32400	17000	31600
18	15400	16400	11300	13900	13000	94200	20200	44900	78400	30900	18600	31600
19	13400	15100	10900	13300	12800	97600	16500	44600	84400	30500	21900	34700
20	13700	12500	10800	13000	12700	98800	14100	46900	87000	30300	28000	37100
21	13800	11700	10800	12800	12700	96400	14100	49900	89500	30500	36600	38500
22	14200	11700	10700	12800	12900	91900	15600	54400	91200	30300	43000	38900
23	14200	13800	10300	12700	12400	86200	18100	59000	89400	28200	48800	36500
24	14200	13700	10300	12700	12700	77800	23500	61900	84500	24100	52700	30200
25	14900	11300	10400	12900	12100	67800	30500	61300	79800	19100	59700	24800
26	15000	11600	10500	12200	12200	59700	37500	61000	75500	16800	65300	21600
27	14800	11400	10600	12400	12500	49600	42300	58700	70900	20100	65900	20800
28	14200	12000	10600	12300	12400	41100	44700	54500	67800	25200	59500	23000
29	14000	13600	10700	12400	---	36400	45800	45300	71500	35300	50200	25000
30	13800	13500	10900	12500	---	35200	47600	39400	73500	45100	45300	24200
31	16500	---	11000	12400	---	32100	---	38300	---	47900	42900	---
TOTAL	457600	481000	379300	391400	351900	1501700	833500	1526400	1816700	1292100	1253300	896500
MEAN	14760	16030	12240	12630	12570	48440	27780	49240	60560	41680	40430	29880
MAX	16700	20600	16900	14400	13300	98800	47600	61900	91200	76500	65900	42500
MIN	13400	11300	10300	11000	12100	12300	14100	38300	36300	16800	17000	17300
AC-FT	907600	954100	752300	776300	698000	2979000	1653000	3028000	3603000	2563000	2486000	1778000
CFSM	.22	.24	.18	.19	.19	.72	.41	.73	.90	.62	.60	.44
IN.	.25	.27	.21	.22	.19	.83	.46	.84	1.00	.71	.69	.49
CAL YR 1989	TOTAL	9078260	MEAN	24870	MAX	103000	MIN	9310	AC-FT	18010000	CFSM	.37
WTR YR 1990	TOTAL	11181400	MEAN	30630	MAX	98800	MIN	10300	AC-FT	22180000	CFSM	.45
									IN.	5.00		
									IN.	6.16		

MISSISSIPPI RIVER MAIN STEM

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05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued
WATER-QUALITY RECORDS

LOCATION.--Samples collected by boat 1.5 mi downstream from discharge station. Prior to April 1981, at bridge on U.S. Highway 18, 1.2 mi upstream from gage.

PERIOD OF RECORD.--Water years 1975 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1975 to current year.

WATER TEMPERATURES: July 1975 to current year.

SUSPENDED-SEDIMENT DISCHARGE: July 1975 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2350 mg/L Mar. 19, 1986; minimum daily mean, 1 mg/L Dec. 23-25, 1976, Dec. 20, 28, 1977, Feb. 13-17, 23, Mar. 5-9, 1986, Dec. 2, 6, 8-11, 1987, Dec. 26, 1988 to Jan. 4, 1989, Jan. 9-11, and Feb. 20, 21, 1989, Jan. 5, 6, 1990.

SEDIMENT LOADS: Maximum daily, 363,000 tons Mar. 19, 1986; minimum daily, 31 tons Dec. 25, 1976.

EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 336 mg/L Mar. 12; minimum daily mean, 1 mg/L Jan. 5, 6.

SEDIMENT LOADS: Maximum daily, 36,000 tons Mar. 16; minimum daily, 32 tons Jan. 5, 6.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	383	459	---	---	---	---	400	---	---	---
2	394	---	---	---	457	431	376	298	321	428	---	---
3	383	---	---	---	---	---	361	---	---	447	468	426
4	---	---	410	---	---	---	---	---	418	---	---	---
5	403	---	---	426	467	426	384	---	447	468	426	---
6	---	---	---	---	---	---	---	---	454	---	---	---
7	398	---	---	---	---	---	---	---	396	468	471	427
8	---	---	410	450	---	---	---	---	440	492	476	---
9	413	---	---	---	414	383	368	---	367	440	492	476
10	394	---	---	---	404	384	349	---	465	494	476	---
11	---	---	435	446	411	---	---	---	450	479	432	433
12	416	---	---	---	381	361	378	389	470	514	448	448
13	---	---	---	449	---	---	---	440	467	467	467	467
14	399	---	---	---	383	368	367	389	440	492	476	476
15	418	---	435	444	404	384	349	351	464	494	476	476
16	---	---	---	443	473	348	378	389	450	479	432	433
17	---	---	---	429	417	329	341	354	467	514	448	448
18	389	417	---	436	460	329	341	354	467	514	448	448
19	429	---	414	438	463	318	337	345	467	514	448	448
20	378	---	414	438	463	318	337	345	467	514	448	448
21	429	352	414	438	463	318	337	345	467	514	448	448
22	432	368	414	438	463	318	337	345	467	514	448	448
23	432	368	414	438	463	318	337	345	467	514	448	448
24	---	---	459	411	467	376	355	415	464	514	448	448
25	---	---	459	411	467	376	355	415	464	514	448	448
26	373	---	414	438	463	318	337	345	467	514	448	448
27	---	---	414	438	463	318	337	345	467	514	448	448
28	---	---	414	438	463	318	337	345	467	514	448	448
29	400	399	414	438	463	318	337	345	467	514	448	448
30	335	---	414	438	463	318	337	345	467	514	448	448
31	---	---	414	438	463	318	337	345	467	514	448	448

MISSISSIPPI RIVER MAIN STEM
05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued
WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	.0	.0	---	---	---	---	26.0	---	---	---
2	15.0	---	---	---	0.0	2.0	6.0	16.0	20.0	26.0	---	---
3	---	12.0	---	---	---	---	---	14.0	---	---	22.0	24.0
4	---	---	1.0	---	---	---	---	---	24.0	---	22.0	24.0
5	12.0	---	---	0.0	0.0	2.0	---	---	18.0	---	24.0	---
6	---	---	---	---	---	---	---	---	---	28.0	---	---
7	---	6.0	---	---	---	---	---	---	---	---	22.0	24.0
8	---	---	.0	.0	---	---	---	---	20.0	27.0	---	---
9	10.0	---	---	---	2.0	---	10.0	---	---	---	---	---
10	---	6.0	---	---	---	4.0	---	16.0	---	28.0	24.0	---
11	---	---	.0	.0	2.0	---	---	---	---	---	---	24.0
12	10.0	---	---	0.0	---	5.0	8.0	---	20.0	26.0	---	---
13	---	---	---	---	4.0	---	---	---	---	24.0	24.0	---
14	---	11.0	---	---	---	---	---	18.0	---	---	24.0	24.0
15	9.0	---	0.0	0.0	---	---	---	---	24.0	---	---	---
16	---	---	---	---	0.0	5.0	8.0	---	---	26.0	---	---
17	---	---	---	---	5.0	---	18.0	---	---	26.0	---	---
18	7.0	---	.0	---	---	---	---	---	---	---	---	11.0
19	8.0	---	0.0	---	---	8.0	---	24.0	---	---	---	---
20	---	4.0	---	---	---	---	---	---	26.0	---	---	---
21	---	---	---	---	---	---	---	18.0	---	---	21.0	14.0
22	12.0	4.0	.0	1.0	---	---	---	---	26.0	---	---	---
23	8.0	4.0	---	---	0.0	5.0	16.0	---	---	27.0	---	14.0
24	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	0.0	1.0	---	---	---	18.0	---	---	---	---
26	---	2.0	---	---	0.0	5.0	18.0	---	26.0	---	---	---
27	---	---	---	---	5.0	---	18.0	---	24.0	24.0	---	---
28	---	---	---	---	---	---	---	18.0	---	---	---	---
29	---	2.0	.0	.0	---	---	---	---	26.0	---	26.0	---
30	12.0	---	---	---	6.0	15.0	---	15.0	25.0	---	20.0	---
31	---	---	---	---	18.0	---	---	18.0	26.0	---	26.0	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)										
OCTOBER												
1	74	3340	59	2770	5	190	4	119	3	102	4	133
2	25	1090	54	2550	4	173	4	122	4	136	5	167
3	25	1090	54	2520	5	274	3	92	4	135	6	206
4	24	1020	60	2770	3	124	2	63	4	133	7	240
5	35	1470	55	2540	4	161	1	32	4	134	7	248
6	31	1230	46	2210	7	291	1	32	3	101	7	249
7	23	919	36	1870	5	201	2	64	3	100	6	215
8	23	919	30	1670	4	149	2	64	15	502	113	4270
9	23	950	26	1430	4	139	4	156	67	2260	59	2770
10	24	940	24	1310	3	101	5	192	55	1860	110	6000
11	25	1050	23	1240	3	99	7	266	31	1040	323	21100
12	24	901	23	1200	3	96	9	343	17	560	336	30300
13	21	777	24	1210	3	96	8	268	10	348	254	30600
14	22	808	24	1170	2	64	6	204	9	309	214	32000
15	33	1260	24	1130	2	64	5	171	9	301	189	33700
16	36	1390	24	1150	2	64	15	522	9	313	164	36000
17	31	1340	34	1570	3	92	24	868	9	323	110	26900
18	29	1210	71	3140	3	92	26	976	8	281	58	14800
19	27	977	40	1630	3	88	25	898	8	276	47	12400
20	25	925	23	776	3	87	18	632	8	274	42	11200
21	22	820	22	695	3	87	6	207	7	240	39	10200
22	19	728	119	3760	4	116	2	69	7	244	36	8930
23	12	460	274	10200	4	111	2	69	7	234	32	7450
24	12	460	337	12500	3	83	3	103	7	240	28	5880
25	22	885	166	5060	2	56	3	104	6	196	23	4210
26	26	1050	54	1690	2	57	3	99	5	165	20	3220
27	28	1120	23	708	3	86	3	100	4	135	19	2540
28	29	1110	10	324	4	114	3	100	4	134	19	2110
29	45	1700	5	184	4	116	3	100	---	---	19	1870
30	87	3240	7	255	4	118	4	135	---	---	21	2000
31	77	3430	---	---	4	119	3	100	---	---	27	2340
TOTAL	---	38609	---	71232	---	3708	---	7270	---	11076	---	314248

MISSISSIPPI RIVER MAIN STEM

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05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued
WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)										
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	28	2540	134	17400	34	3400	62	12600	47	5890	50	5740
2	27	2330	133	17000	46	4510	65	13400	49	6380	45	5100
3	26	2200	125	15800	55	5490	62	12700	50	6530	43	4640
4	26	2060	107	13900	51	5250	55	10800	51	6660	42	3900
5	25	1780	82	11000	44	4560	54	9510	49	6360	41	2780
6	25	1570	55	7570	45	4940	53	8040	48	6070	40	2280
7	24	1440	41	5620	46	5070	52	6750	46	5510	40	1870
8	25	1540	40	5350	46	5250	54	6630	46	5370	40	1910
9	28	1960	48	6390	48	5780	64	7790	44	4780	53	3230
10	31	2430	61	8320	52	6420	68	8410	42	4330	70	5200
11	34	2760	57	7260	55	6820	64	7970	36	3350	86	6760
12	32	2560	53	6470	54	6660	53	6450	30	2380	82	6990
13	29	2200	50	5940	47	5940	57	6290	25	1650	61	5250
14	25	1800	48	5590	40	5370	57	5830	20	1200	45	3920
15	23	1560	45	5350	44	6250	55	5260	17	817	37	3250
16	28	1870	42	5170	51	8410	53	4840	16	739	33	2840
17	34	2110	40	4960	44	8490	52	4550	23	1060	32	2730
18	50	2730	40	4850	32	6770	52	4340	48	2410	64	5460
19	84	3740	41	4940	27	6150	51	4200	98	5790	54	5060
20	81	3080	46	5820	40	9400	50	4090	161	12200	40	4010
21	59	2250	51	6870	42	10100	46	3790	226	22300	36	3740
22	53	2230	50	7340	36	8860	39	3190	167	19400	38	3990
23	50	2440	43	6850	36	8690	35	2660	70	9220	42	4140
24	48	3050	35	5850	36	8210	34	2210	61	8680	53	4320
25	47	3870	29	4800	37	7970	33	1700	61	9830	53	3550
26	46	4660	26	4280	37	7540	32	1450	60	10600	48	2800
27	58	6620	30	4750	36	6890	32	1740	59	10500	44	2470
28	85	10300	37	5440	36	6590	32	2180	54	8680	150	9310
29	103	12700	35	4280	56	10800	34	3240	49	6640	94	6340
30	125	16100	36	3830	71	14100	40	4870	55	6730	65	4250
31	--	--	33	3410	--	--	45	5820	54	6250	--	--
TOTAL	---	108480	---	222400	---	210680	---	183300	---	208306	---	127830
YEAR		1507139										

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-CHARGE, INST.		SEDI-MENT, DIS-		SED. SUSP.	
		TEMPER-ATURE	CUBIC FEET	SEDI-MENT, SUS-	DIS-PENDED	CHARGE,	SIEVE DIAM.
(DEG C)	(SECOND)	(00061)	(80154)	(T/DAY)	(80155)	% FINE THAN	(70331)
OCT 25...	1240	18.0	10600	22	629	93	
APR 11...	1300	8.5	31300	39	3200	97	
MAY 23...	1230	16.0	56300	42	6380	97	
JUL 11...	1245	21.0	49000	70	9260	99	
AUG 23...	1245	24.0	45300	71	8680	97	
SEP 27...	1400	17.0	19500	46	2420	98	

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED-MATERIAL, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	BED NUMBER		BED MAT.		BED MAT.		BED MAT.		BED MAT.	
		OF SIEVE	SIEVE								
SAMPLING POINTS	% FINER THAN										
OCT 25...	1220	3	1	4	20	80	92	97	100		
APR 11...	1300	2	0	1	8	80	99	100	--		
MAY 23...	1230	2	0	1	17	92	99	100	--		
AUG 23...	1245	4	2	10	47	92	.99	99	100		
SEP 27...	1400	4	1	2	23	90	97	99	100		

TURKEY RIVER BASIN

05411600 TURKEY RIVER AT SPILLVILLE, IA

LOCATION.--Lat 43°12'28", long 91°56'56", in SW1/4 NE1/4 sec.19, T.97 N., R.9 W., Winneshiek County, Hydrologic Unit 07060004, on right bank 60 ft downstream from bridge on county highway W14 at north edge of Spillville, 150 ft downstream from old mill dam, 0.6 mi upstream from Wonder Creek and at mile 98.5.

DRAINAGE AREA.--177 mi².

PERIOD OF RECORD.--June 1956 to September 1973, October 1977 to current year. Monthly discharge only for some periods, published in WSP 1728.

REVISED RECORDS.--WDR IA-75-1: 1974.

GAGE.--Water-stage recorder. Datum of gage is 1,034.92 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 3, Nov. 16 to Mar. 9, Mar. 17-22, May 23-25, May 28 to June 14, June 18 to July 12 and Aug. 5-24. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--30 years, 121 ft³/s, 9.28 in/yr, 87,660 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,600 ft³/s July 12, 1972, gage height, 16.73 ft; maximum gage height 16.76 ft, Aug. 25, 1990; minimum daily discharge, 4.4 ft³/s Feb. 1-3, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of 18.4 ft, from floodmark, discharge, about 10,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 3	1700	2,040	(a) 10.42	Mar. 14	2400	1,650	8.95
Mar. 11	1600	1,920	9.43	Aug. 25	0930	*8,320	*16.76

(a) Ice jam

Minimum daily discharge, 5.6 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	18	9.0	9.3	8.5	17	57	84	105	112	117	253
2	9.4	18	9.1	9.7	8.3	20	57	75	105	103	98	252
3	9.4	18	8.1	10	8.2	35	55	68	115	93	86	238
4	9.8	18	9.0	9.7	8.7	60	55	62	112	85	108	219
5	12	17	10	9.3	9.3	45	54	58	105	79	150	194
6	11	16	9.6	9.9	10	40	53	54	98	73	140	170
7	10	18	9.3	11	11	40	51	50	93	67	115	150
8	11	17	8.8	12	13	600	50	47	88	61	97	144
9	11	16	8.6	12	14	950	51	64	83	63	90	136
10	11	17	8.4	11	16	510	52	101	79	69	85	129
11	11	16	8.0	11	15	638	42	139	73	73	84	119
12	11	15	7.8	10	19	731	38	129	70	78	80	113
13	11	16	7.5	10	25	278	41	113	100	70	73	106
14	11	16	7.3	9.3	23	730	52	102	212	66	67	103
15	11	15	7.0	10	21	1120	51	92	206	63	64	104
16	13	14	6.8	11	18	448	52	90	188	59	68	102
17	12	12	6.6	11	17	276	52	86	226	56	80	100
18	13	10	6.4	13	16	190	50	81	245	56	100	98
19	12	9.0	6.2	15	15	160	95	134	250	70	130	105
20	12	9.8	6.0	13	16	140	62	259	235	77	160	103
21	13	11	5.8	11	15	120	54	286	215	75	190	99
22	13	10	5.6	10	17	100	50	240	250	77	250	96
23	15	9.0	5.9	9.6	16	90	48	215	335	70	200	83
24	13	8.0	6.4	9.4	15	83	46	190	305	64	176	65
25	12	8.7	7.0	8.6	15	79	44	162	255	59	4630	62
26	12	9.3	7.3	9.0	14	73	42	151	265	59	3610	65
27	12	9.6	7.9	8.7	15	68	53	142	270	90	612	68
28	14	10	8.5	8.9	16	64	64	148	185	159	374	70
29	13	9.9	9.0	8.7	---	61	82	135	150	191	284	69
30	17	9.3	9.6	8.5	---	59	92	120	129	172	252	68
31	20	---	9.0	8.7	---	57	---	112	---	146	254	---
TOTAL	375.6	400.6	241.5	318.3	415.0	7882	1645	3789	5147	2635	12824	3683
MEAN	12.1	13.4	7.79	10.3	14.8	254	54.8	122	172	85.0	414	123
MAX	20	18	10	15	25	1120	95	286	335	191	4630	253
MIN	9.4	8.0	5.6	8.5	8.2	17	38	47	70	56	64	62
AC-FT	745	795	479	631	823	15630	3260	7520	10210	5230	25440	7310
CFSM	.07	.08	.04	.06	.08	1.44	.31	.69	.97	.48	2.34	.69
IN.	.08	.08	.05	.07	.09	1.66	.35	.80	1.08	.55	2.70	.77

CAL YR 1989 TOTAL 8932.4 MEAN 24.5 MAX 450 MIN 5.6 AC-FT 17720 CFSM .14 IN. 1.88
WTR YR 1990 TOTAL 39356.0 MEAN 108 MAX 4630 MIN 5.6 AC-FT 78060 CFSM .61 IN. 8.27

TURKEY RIVER BASIN

67

05412060 SILVER CREEK NEAR LUANA, IA

LOCATION.--Lat 43°01'19", long 91°29'21", in NE1/4 SEC.25, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, on right upstream bank of bridge on county road W70, 2.3 miles south of Highway 52 and 18, and 3.2 miles south of Luana.

DRAINAGE AREA.--4.39 mi².

PERIOD OF RECORD.--May 1986 to current year.

GAGE.--Water-stage recorder.

REMARKS.--Estimated daily discharges: Dec. 11 to Mar. 3. Records fair except those for estimated daily discharges, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 299 ft³/s Mar. 8, 1990, gage height 8.21; maximum gage height, 8.78 (backwater from ice); no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 50 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 8	1045	*299	*8.21				
Aug. 4	0330	122	6.70	Aug. 25	0445	293	8.17

No flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.07	.22	.07	.00	.00	.70	.24	.25	.56	1.4	.92	2.8
2	.07	.19	.09	.00	.00	.50	.27	.25	5.1	1.3	.88	2.4
3	.07	.16	.03	.00	.00	.35	.23	.25	1.8	1.2	.93	2.4
4	.04	.17	.08	.00	.00	.26	.25	.30	.79	1.2	23	2.4
5	.22	.17	.15	.00	.02	.20	.25	.30	.70	1.1	2.3	2.2
6	.13	.17	.12	.00	.10	.13	.20	.30	.67	.99	1.5	1.6
7	.09	.17	.06	.00	3.0	.12	.18	.28	.61	.97	1.3	1.5
8	.08	.16	.04	.01	.80	55	.21	.25	.60	.97	1.3	1.5
9	.09	.11	.03	.02	.25	2.9	.26	.52	.56	.97	1.1	1.5
10	.10	.10	.03	.02	.15	.89	.40	.46	.52	.97	1.1	1.4
11	.10	.10	.02	.01	.06	30	.32	.38	.52	.97	1.1	1.4
12	.09	.10	.00	.00	.13	3.0	.27	.35	1.3	.97	.98	1.3
13	.08	.10	.00	.00	.08	2.6	.27	.35	6.3	.94	.90	1.1
14	.08	.10	.00	.00	.06	1.5	.27	.35	1.0	.88	.88	1.1
15	.10	.10	.00	.00	.04	.81	.27	.35	3.1	.88	.88	1.1
16	.30	.07	.00	.01	.03	.49	.27	.41	2.2	.88	.81	.98
17	.16	.07	.00	.03	.02	.40	.28	.41	4.8	.83	.94	.89
18	.14	.06	.00	.02	.03	.26	.30	.41	2.0	1.3	1.0	.88
19	.14	.08	.00	.01	.02	.24	.30	2.3	1.3	3.6	4.5	.88
20	.14	.11	.00	.01	.02	.25	.30	2.1	1.2	2.6	3.4	.88
21	.14	.07	.00	.02	.01	.27	.30	1.0	.99	1.4	1.9	.88
22	.12	.08	.00	.02	.02	.33	.30	.81	6.4	1.3	1.3	.88
23	.12	.08	.00	.01	.03	.25	.29	.74	5.5	1.2	1.2	.88
24	.11	.07	.00	.00	.02	.22	.27	.71	4.1	1.2	5.4	.81
25	.09	.08	.00	.00	.02	.26	.26	.64	3.0	1.2	107	.77
26	.10	.08	.00	.00	.01	.25	.25	.62	2.4	1.2	15	.74
27	.10	.11	.00	.00	.02	.22	.27	.58	2.1	3.0	8.3	.74
28	.10	.07	.00	.00	.04	.22	.29	.64	1.8	1.9	6.0	.74
29	.10	.04	.00	.00	---	.22	.30	.64	1.6	1.5	5.1	.72
30	.28	.04	.00	.00	---	.22	.27	.60	1.5	1.4	4.1	.69
31	.31	---	.00	.00	---	.22	---	.56	---	.96	3.4	---
TOTAL	3.86	3.23	0.72	0.19	4.98	103.28	8.14	18.11	65.02	41.18	208.42	38.06
MEAN	.12	.11	.023	.006	.18	3.33	.27	.58	2.17	1.33	6.72	1.27
MAX	.31	.22	.15	.03	3.0	.55	.40	2.3	6.4	3.6	107	2.8
MIN	.04	.04	.00	.00	.00	.12	.18	.25	.52	.83	.81	.69
AC-FT	7.7	6.4	1.4	.4	9.9	205	16	36	129	82	413	75
CFSM	.03	.02	.01	.00	.04	.76	.06	.13	.49	.30	1.53	.29
IN.	.03	.03	.01	.00	.04	.88	.07	.15	.55	.35	1.77	.32

CAL YR 1989 TOTAL 268.38 MEAN .74 MAX 83 MIN .00 AC-FT 532 CFSM .17 IN. 2.27
WTR YR 1990 TOTAL 495.19 MEAN 1.36 MAX 107 MIN .00 AC-FT 982 CFSM .31 IN. 4.20

TURKEY RIVER BASIN

05412070 UNNAMED CREEK NEAR LUANA, IA

LOCATION.--Lat 43°02'24", long 91°28'07", in SE 1/4 sec.18, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, on right upstream bank at culvert on the north-south gravel road between county road W70 and county road X16, 0.8 mile south of State Highway 52 and 18 and approximately 1.6 miles south of Luana.

DRAINAGE AREA.--1.15 mi².

PERIOD OF RECORD.--May 1986 to current year.

GAGE.--Water-stage recorder.

REMARKS.--Estimated daily discharges: Jan. 3 to Mar. 8. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 110 ft³/s Aug. 25, 1990, gage height, 11.99 ft; maximum gage height, 11.99 ft, Aug. 25, 1990; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 25 ft³/s and maximum (*);

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Aug. 4	0100	73	11.46			*110	*11.99

No flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.25	.00	.00	.00	.15	.09	.94
2	.00	.00	.00	.00	.00	.15	.00	.00	.01	.09	.04	.80
3	.00	.00	.00	.00	.00	.11	.00	.00	.00	.08	.06	.80
4	.00	.00	.00	.00	.00	.08	.00	.00	.00	.08	4.7	.94
5	.01	.00	.00	.00	.07	.05	.00	.00	.00	.07	.07	.86
6	.00	.00	.00	.00	.22	.02	.00	.00	.00	.23	.04	.35
7	.00	.00	.00	.00	.4	.00	.00	.00	.00	.20	.05	.24
8	.00	.00	.00	.00	.52	2.5	.00	.00	.00	.13	.07	.17
9	.00	.00	.00	.00	.3	.32	.00	.00	.00	.24	.52	.28
10	.00	.00	.00	.00	.15	.04	.00	.00	.00	.17	1.2	.28
11	.00	.00	.00	.00	.1	4.7	.00	.00	.00	.07	1.1	.16
12	.00	.00	.00	.00	.13	1.4	.00	.00	.00	.11	1.0	.15
13	.00	.00	.00	.00	.09	.89	.00	.00	1.0	.08	.79	.14
14	.00	.00	.00	.00	.06	.23	.00	.00	.05	.07	.48	.12
15	.00	.00	.00	.00	.04	.04	.00	.00	.57	.06	.17	.13
16	.01	.00	.00	.02	.02	.00	.00	.00	1.0	.07	.10	.11
17	.00	.00	.00	.01	.01	.00	.00	.00	.62	.05	.54	.09
18	.00	.00	.00	.00	.03	.00	.00	.01	.11	.12	.40	.08
19	.00	.00	.00	.00	.02	.00	.00	.00	.10	.59	1.6	.09
20	.00	.00	.00	.00	.02	.00	.00	.00	.11	.11	.46	.12
21	.00	.00	.00	.00	.02	.00	.00	.00	.07	.08	.24	.08
22	.00	.00	.00	.02	.03	.00	.00	.00	1.7	.06	.19	.06
23	.00	.00	.00	.01	.02	.00	.00	.01	.09	.06	.34	.06
24	.00	.00	.00	.00	.01	.00	.00	.00	.09	.06	1.9	.05
25	.00	.00	.00	.00	.01	.00	.00	.00	.07	.11	21	.06
26	.00	.00	.00	.00	.00	.00	.00	.00	.08	.08	9.1	.15
27	.00	.00	.00	.00	.02	.00	.00	.00	.08	.27	3.0	.22
28	.00	.00	.00	.00	.03	.00	.00	.00	.08	.27	2.2	.07
29	.00	.00	.00	.00	--	.00	.00	.00	.09	.23	1.6	.07
30	.01	.00	.00	.00	--	.00	.00	.00	.08	.38	1.4	.07
31	.00	--	.00	.00	--	.00	--	.01	--	.25	1.2	--
TOTAL	0.03	0.00	0.00	0.06	2.32	10.78	0.00	0.03	6.00	4.62	55.65	7.74
MEAN	.001	.000	.000	.002	.083	.35	.000	.001	.20	.15	1.80	.26
MAX	.01	.00	.00	.02	.52	4.7	.00	.01	1.7	.59	.21	.94
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.04	.05
AC-FT	.06	.00	.00	.1	4.6	.21	.00	.06	.12	9.2	110	15
CFSM	.00	.00	.00	.00	.07	.30	.00	.00	.17	.13	1.56	.22
IN.	.00	.00	.00	.00	.08	.35	.00	.00	.19	.15	1.80	.25

CAL YR 1989	TOTAL 28.89	MEAN .079	MAX 7.0	MIN .00	AC-FT 57	CFSM .07	IN. .93
WTR YR 1990	TOTAL 87.23	MEAN .24	MAX 21	MIN .00	AC-FT 173	CFSM .21	IN. 2.82

TURKEY RIVER BASIN

69

05412100 ROBERTS CREEK ABOVE SAINT OLAF, IA

LOCATION.--Lat 42°55'49", long 91°23'03", in NW1/4 sec.25, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, on left downstream bank at bridge on road X28, 0.1 mi north of county road B65, on north edge of St. Olaf.

DRAINAGE AREA.--70.7 mi².

PERIOD OF RECORD.--September 1957 to July 1977 (operated as a low-flow station only), March 1986 to current year.

GAGE.--Water-stage recorder. Datum of gage is 826.73 ft above NGVD.

REMARKS.--Estimated daily discharges: Jan. 9 to Mar. 8. Records poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,020 ft³/s Mar. 11, 1989, gage height, 15.77 ft, backwater from ice; maximum gage height, 16.52 ft, Mar. 8, 1990, backwater from ice, no flow for several days in 1989 and 1990.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 8	1830	702	(a)*16.52			*758	14.88

(a) Ice jam

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.14	.09	.00	.00	.05	1.8	2.6	.77	2.8	11	6.6	20
2	.04	.00	.00	.00	.04	2.0	2.5	.76	5.2	8.8	6.0	18
3	.04	.00	.00	.00	.10	2.5	2.5	.64	16	7.6	5.6	16
4	.07	.00	.00	.00	.60	3.0	2.5	.71	8.5	7.6	5.2	15
5	.23	.00	.00	.00	2.0	2.0	2.4	.82	6.6	6.4	19	15
6	.18	.00	.00	.00	30	1.6	2.1	.88	6.6	5.5	8.1	13
7	.11	.00	.00	.00	27	1.4	1.9	.79	5.7	4.5	5.9	12
8	.06	.00	.00	.00	35	35	1.9	.65	5.0	5.3	5.4	10
9	.07	.00	.00	.00	17	187	2.0	1.1	4.2	4.1	4.9	9.3
10	.05	.00	.00	.05	8.0	35	3.0	2.4	3.6	3.3	4.5	8.4
11	.11	.00	.00	.10	6.0	175	4.9	2.2	3.3	3.0	4.1	7.7
12	.09	.00	.00	.05	8.0	80	2.9	1.4	3.0	3.5	3.7	7.2
13	.06	.00	.00	.01	6.0	39	2.8	1.2	4.6	3.2	3.6	6.7
14	.05	.00	.00	.00	4.0	97	3.1	1.1	16	3.0	3.1	6.4
15	.08	.00	.00	.00	3.0	41	2.6	1.0	7.6	2.3	3.0	6.2
16	.26	.00	.00	.00	2.2	22	2.4	1.4	18	2.4	3.2	5.7
17	.16	.00	.00	.10	1.7	12	1.6	1.5	26	2.7	4.2	5.1
18	.02	.00	.00	.25	1.9	8.0	1.6	1.3	31	7.1	4.6	5.0
19	.00	.00	.00	1.0	1.8	5.0	1.5	3.6	21	19	11	5.9
20	.00	.00	.00	1.5	1.9	5.6	2.2	27	19	31	24	5.6
21	.00	.00	.00	2.0	2.1	5.5	2.0	15	16	17	17	5.0
22	.00	.00	.00	1.0	2.2	5.5	1.6	9.3	35	9.3	11	4.7
23	.00	.00	.00	.65	2.2	4.7	1.1	7.1	56	7.1	8.6	4.4
24	.00	.00	.00	.40	1.9	3.9	1.0	5.9	33	6.0	9.5	4.2
25	.00	.00	.00	.25	1.6	4.1	.80	5.8	23	5.9	426	4.0
26	.00	.00	.00	.15	1.4	3.1	1.0	5.5	25	5.8	117	4.0
27	.00	.01	.00	.09	1.7	2.8	.74	4.9	22	8.9	64	4.1
28	.00	.00	.00	.07	1.7	2.8	.83	5.1	17	24	44	3.7
29	.03	.00	.00	.06	---	2.5	.96	5.2	15	15	33	3.7
30	.17	.00	.00	.06	---	2.5	.76	3.6	14	10	27	4.0
31	.31	---	.00	.05	---	2.5	---	3.1	---	7.9	23	---
TOTAL	2.33	0.10	0.00	7.84	171.09	795.8	59.79	121.72	469.7	258.2	915.8	240.0
MEAN	.075	.003	.000	.25	6.11	25.7	1.99	3.93	15.7	8.33	29.5	8.00
MAX	.31	.09	.00	2.0	35	187	4.9	27	56	31	426	20
MIN	.00	.00	.00	.00	.04	1.4	.74	.64	2.8	2.3	3.0	3.7
AC-FT	4.6	.2	.00	16	339	1580	119	241	932	512	1820	476
CFSM	.00	.00	.00	.00	.09	.37	.03	.06	.22	.12	.42	.11
IN.	.00	.00	.00	.00	.09	.42	.03	.06	.25	.14	.49	.13

CAL YR 1989	TOTAL 1450.80	MEAN 3.97	MAX 290	MIN .00	AC-FT 2880	CFSM .06	IN. .77
WTR YR 1990	TOTAL 3042.37	MEAN 8.34	MAX 426	MIN .00	AC-FT 6030	CFSM .12	IN. 1.62

TURKEY RIVER BASIN

05412500 TURKEY RIVER AT GARBER, IA

LOCATION.--Lat $42^{\circ}44'24''$, long $91^{\circ}15'42''$, in SE1/4 NW1/4 sec.36, T.92 N., R.4 W., Clayton County, Hydrologic Unit 07060004, on left bank 10 ft downstream from bridge on county highway C43, 800 ft upstream from Wayman Creek, 1,000 ft southeast of Garber, 2,000 ft downstream from Elk Creek, 1 mi downstream from Volga River, and 19.8 mi upstream from mouth.

DRAINAGE AREA.--1,545 mi².

PERIOD OF RECORD.--August 1913 to November 1916, May 1919 to September 1927, April 1929 to September 1930, October 1932 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1922-25 (M), 1927 (M). WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 634.46 ft above NGVD. Prior to Feb. 7, 1935, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 16 to Mar. 8. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--70 years (water years 1914-16, 1920-27, 1930, 1933-90), 942 ft³/s, 8.28 in/yr, 682,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,300 ft³/s Feb. 23, 1922, gage height, 28.06 ft, from flood-mark; minimum daily discharge, 49 ft³/s Jan. 28, 29, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1890, that of Feb. 23, 1922.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Aug. 27	2300	*23,000	*24.63			No other peak greater than base discharge.	

Minimum daily discharge, 56 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	146	224	186	82	194	194	506	494	833	1050	1320	2390
2	143	235	184	97	167	285	499	497	807	932	1100	2060
3	137	265	162	102	172	340	482	472	974	871	940	1840
4	135	255	170	166	189	300	468	461	864	801	945	1710
5	145	252	158	215	230	270	445	438	843	738	1070	1580
6	158	239	169	208	246	250	425	419	798	673	1160	1450
7	164	240	166	193	229	310	407	402	752	622	1000	1320
8	156	231	144	194	260	2310	394	384	732	592	826	1210
9	154	228	122	210	256	3520	389	818	692	556	717	1160
10	151	225	125	196	234	2630	416	590	650	526	648	1080
11	148	210	108	216	206	3000	438	612	615	513	605	1010
12	145	207	87	204	223	2740	433	737	585	524	616	947
13	141	202	86	178	254	2630	428	753	615	537	582	894
14	141	199	75	175	396	2760	435	681	1110	503	522	851
15	142	196	67	198	334	3210	433	643	1230	479	491	808
16	182	188	69	265	331	3710	436	811	1370	461	455	773
17	202	189	74	341	220	2480	433	658	1690	440	995	737
18	191	176	68	342	197	1720	425	612	1960	423	1040	713
19	186	170	63	300	179	1330	420	1190	1960	535	1510	717
20	184	163	61	262	172	1090	443	1860	1770	691	2020	727
21	179	181	58	230	196	964	489	2590	1610	720	3810	717
22	174	169	56	246	192	894	475	2140	1800	722	2940	682
23	171	150	61	285	185	833	462	1770	2640	624	2150	653
24	167	185	68	319	164	765	447	1500	2580	564	1930	627
25	163	180	76	261	177	706	430	1350	2020	524	13000	614
26	157	171	78	217	169	660	411	1230	1770	488	19500	596
27	154	160	79	234	173	621	398	1130	2140	516	22300	582
28	162	168	90	205	176	588	405	1200	1450	1580	16600	567
29	167	204	91	210	---	563	423	1060	1290	2810	4840	549
30	209	195	80	216	---	539	464	963	1170	2050	3500	537
31	227	---	81	175	---	519	---	889	---	1710	2820	---
TOTAL	5081	6057	3162	6742	6121	42731	13159	29354	39320	24775	111952	30101
MEAN	164	202	102	217	219	1378	439	947	1311	799	3611	1003
MAX	227	265	186	342	396	3710	506	2590	2640	2810	22300	2390
MIN	135	150	56	82	164	194	389	384	585	423	455	537
AC-FT	10080	12010	6270	13370	12140	84760	26100	58220	77990	49140	222100	59710
CFSM	.11	.13	.07	.14	.14	.89	.28	.61	.85	.52	2.34	.65
IN.	.12	.15	.08	.16	.15	1.03	.32	.71	.95	.60	2.70	.72

CAL YR 1989	TOTAL 109333	MEAN 300	MAX 5050	MIN 56	AC-FT 216900	CFSM .19	IN. 2.63
WTR YR 1990	TOTAL 318555	MEAN 873	MAX 22300	MIN 56	AC-FT 631900	CFSM .56	IN. 7.67

MAQUOKETA RIVER BASIN

71

05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IA

LOCATION.--Lat 42°08'48", long 90°40'33" in SW1/4 NE1/4 sec.25, T.85 N., R.2 E, Jackson County, Hydrologic Unit 07060006, on right downstream bank at bridge on State Highway 61, 7.8 mi upstream from mouth, and 5.5 mi north of junction of State Highway 64 and 61 and 0.5 mi south of Fulton.

DRAINAGE AREA.--516 mi².

PERIOD OF RECORD.--July 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 666.19 ft above NGVD. Nonrecording gage July 7 to September 22, 1977.

REMARKS.--Estimated daily discharges: Nov. 17, 18, 22-24, Nov. 28 to Jan. 17, Jan. 26 to Feb. 1, and Feb. 14-28. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--13 years, 343 ft³/s, 9.03 in/yr, 248,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,700 ft³/s Aug. 31, 1981, gage height, 17.26 ft; minimum daily discharge, 46 ft³/s Dec. 24, 25, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 18, 1974 reached a stage of 16.0 ft., from floodmark, discharge 10,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 17	1415	4,830	(a) 11.46	Aug. 20	0330	4,820	10.85
June 29	1745	*6,160	*12.30	Aug. 25	2200	5,200	11.28
Aug. 18	0145	6,120	12.26				

(a) Ice jam

Minimum daily discharge, 46 ft³/s Dec. 24, 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	104	122	105	69	138	122	150	137	174	516	314	427
2	104	114	110	70	149	168	149	134	180	375	267	378
3	100	107	120	80	145	254	145	132	180	314	293	341
4	100	109	115	82	138	164	144	147	171	282	374	318
5	105	110	122	78	137	139	140	152	183	278	223	302
6	117	107	130	74	203	126	134	153	185	250	203	288
7	117	111	120	77	270	115	130	145	187	238	191	273
8	110	115	130	75	222	763	132	141	185	232	183	259
9	105	111	120	88	234	1600	132	148	181	225	179	245
10	104	111	112	108	348	647	137	183	169	202	171	240
11	105	109	105	82	214	427	135	224	160	205	167	229
12	105	105	94	73	179	444	128	195	160	201	165	221
13	102	107	85	61	168	402	127	193	359	193	161	207
14	103	106	70	66	118	450	140	179	229	185	159	216
15	103	107	60	68	118	1220	140	167	142	180	155	204
16	103	105	50	150	120	575	133	249	353	184	153	198
17	103	108	52	1500	140	371	129	343	715	184	1810	193
18	103	109	53	1250	152	291	125	295	347	182	3080	188
19	102	115	53	415	150	247	126	287	286	190	1750	190
20	103	124	54	278	140	222	146	552	241	267	3240	190
21	103	115	53	229	148	208	155	477	234	268	1430	194
22	103	105	51	194	160	203	147	344	247	223	1020	189
23	103	116	50	177	180	189	141	294	346	204	700	180
24	104	115	46	169	128	175	138	264	377	180	551	175
25	103	114	46	169	100	166	136	261	276	175	2370	180
26	103	117	48	170	98	163	135	250	238	179	3510	179
27	100	113	50	160	100	156	139	237	963	175	1220	178
28	100	108	52	152	102	152	154	222	500	633	901	178
29	102	96	60	148	---	151	152	210	3100	1700	701	171
30	110	98	68	132	---	149	147	211	1260	796	615	172
31	122	---	67	129	---	150	---	193	---	416	493	---
TOTAL	3251	3309	2451	6573	4499	10609	4166	7119	12328	9832	26749	6903
MEAN	105	110	79.1	212	161	342	139	230	411	317	863	230
MAX	122	124	130	1500	348	1600	155	552	3100	1700	3510	427
MIN	100	96	46	61	98	115	125	132	142	175	153	171
AC-FT	6450	6560	4860	13040	8920	21040	8260	14120	24450	19500	53050	13690
CFSM	.20	.21	.15	.41	.31	.66	.27	.45	.80	.61	1.67	.45
IN.	.23	.24	.18	.47	.32	.76	.30	.51	.89	.71	1.93	.50

CAL YR 1989 TOTAL 53713 MEAN 147 MAX 3000 MIN 46 AC-FT 106500 CFSM .29 IN. 3.87
WTR YR 1990 TOTAL 97789 MEAN 268 MAX 3510 MIN 46 AC-FT 194000 CFSM .52 IN. 7.05

MAQUOKETA RIVER BASIN

05418500 MAQUOKETA RIVER NEAR MAQUOKETA, IA

LOCATION.--Lat $42^{\circ}05'05''$, long $90^{\circ}38'04''$, in SW1/4 NE1/4 sec.17, T.84 N., R.3 E., Jackson County, Hydrologic Unit 07060006, on right bank 300 ft upstream from bridge on State Highway 62, 1,200 ft upstream from Prairie Creek, 2.0 mi northeast of Maquoketa, 2.2 mi downstream from North Fork, and 26.7 mi upstream from mouth.

DRAINAGE AREA.--1,553 mi².

PERIOD OF RECORD.--September 1913 to current year. Prior to October 1939, published as "below North Fork near Maquoketa". Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 405: 1914. WSP 1438: Drainage area. WSP 1508: 1914-17, 1919-25, 1926 (M), 1929, 1933-34 (M), 1943.

GAGE.--Water-stage recorder. Datum of gage is 625.96 ft above NGVD. Prior to July 14, 1924, nonrecording gage, and July 15, 1924 to Sept. 30, 1972, recording gage at same site at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 11 to Jan. 17, Jan. 21-24, and June 16-18. Records good except those estimated daily discharges, which are poor. Diurnal fluctuation caused by powerplant 4 mi upstream of station. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--77 years, 1,021 ft³/s, 8.93 in/yr, 739,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 48,000 ft³/s June 27, 1944, gage height, 24.70 ft, at datum then in use; minimum daily discharge, 105 ft³/s Feb. 11-20, 1936.

EXTREMES OUTSIDE PERIOD OF RECORD.--A flood, probably in 1903, reached a stage of 23.5 ft, discharge, 43,000 ft³/s, at datum in use prior to Oct. 1, 1972.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7,500 ft³/s and maximum (*)

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 29	2115	*11,900	*23.86	Aug. 20	0600	11,300	23.50
Aug. 18	0630	8,340	21.20	Aug. 26	1100	10,500	22.91

Minimum daily discharge, 125 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	268	313	249	175	314	332	480	395	962	2330	1040	2060
2	273	291	284	190	308	390	512	389	915	1890	965	1700
3	253	276	206	205	327	562	487	425	906	1380	802	1570
4	288	279	249	220	237	436	449	392	853	1230	1420	1360
5	300	286	283	210	301	397	476	441	948	1200	789	1330
6	435	278	307	205	330	312	398	419	905	1150	734	910
7	400	240	252	200	457	312	391	429	866	981	634	1070
8	415	194	252	215	431	1230	381	421	855	891	616	1030
9	375	178	257	260	467	2250	359	432	877	852	623	965
10	425	266	267	350	645	1680	404	439	835	797	600	909
11	437	277	250	310	537	1400	370	891	779	783	585	879
12	445	263	210	280	489	1170	363	1000	698	753	530	818
13	440	256	190	250	401	1250	396	869	782	658	528	780
14	432	272	170	270	369	1270	407	796	1040	649	505	782
15	409	251	150	340	233	2810	407	746	797	619	480	721
16	567	241	140	540	242	1690	361	1000	1400	627	475	691
17	351	252	155	1100	333	1700	398	1120	4300	570	1930	681
18	312	202	150	1830	327	1380	366	1520	3800	523	5910	645
19	310	200	145	1360	351	1100	394	1200	2990	618	3880	649
20	345	284	140	1080	310	865	398	1970	2200	646	8700	649
21	357	295	130	840	356	851	417	3000	2060	847	4040	688
22	346	317	130	680	520	778	461	2470	2160	774	3300	592
23	358	255	125	580	732	729	410	1930	2120	688	2690	566
24	339	237	130	470	450	652	438	1490	2490	634	2010	659
25	295	287	140	364	310	659	413	1410	2170	568	4080	558
26	276	283	140	362	339	548	420	1290	1830	514	9660	589
27	269	297	145	360	351	537	442	1220	2290	546	7450	551
28	276	291	160	308	366	544	467	1160	2020	706	5650	545
29	278	221	165	303	---	502	464	1070	7170	2410	3280	539
30	301	199	165	315	---	538	404	1120	5610	1920	2610	495
31	319	---	170	319	---	482	---	1090	---	1290	2430	---
TOTAL	10894	7781	5906	14491	10833	29356	12533	32544	57628	30044	78946	25981
MEAN	351	259	191	467	387	947	418	1050	1921	969	2547	866
MAX	567	317	307	1830	732	2810	512	3000	7170	2410	9660	2060
MIN	253	178	125	175	233	312	359	389	698	514	475	495
AC-FT	21610	15430	11710	28740	21490	58230	24860	64550	114300	59590	156600	51530
CFSM	.23	.17	.12	.30	.25	.61	.27	.68	1.24	.62	1.64	.56
IN.	.26	.19	.14	.35	.26	.70	.30	.78	1.38	.72	1.89	.62

CAL YR 1989 TOTAL 148786 MEAN 408 MAX 4490 MIN 125 AC-FT 295100 CFSM .26 IN. 3.56
WTR YR 1990 TOTAL 316937 MEAN 868 MAX 9660 MIN 125 AC-FT 628600 CFSM .56 IN. 7.59

MISSISSIPPI RIVER MAIN STEM

73

05420500 MISSISSIPPI RIVER AT CLINTON, IA

LOCATION.--Lat 41°46'50", long 90°15'07", (revised) in NW1/4 sec.34, T.81 N., R.6 E., Clinton County, Hydrologic Unit 07080101, on right bank at foot of Eight Avenue in Camanche, 5.0 mi upstream from Wapsipinicon River, 6.4 mi downstream from Clinton, 10.6 mi downstream from Lock and Dam 13, and at mile 511.8 upstream from Ohio River.

DRAINAGE AREA.--85,600 mi², approximately, at Fulton-Lyons Bridge at Clinton.

PERIOD OF RECORD.--June to August 1873 (fragmentary), October 1873 to current year (October 1932 to September 1939, published as "at Le Claire").

REVISED RECORDS.--WDR IA-75-1: 1974.

GAGE.--Water-stage recorder. Datum of gage is 562.68 ft above NGVD. June 6, 1969 to Sept. 16 1988, water-stage recorder at site 400 ft upstream at same datum. Auxiliary water-stage recorder at Lock and Dam 13 since Oct. 1, 1958. See WSP 1728 for history of changes prior to Oct. 1, 1955.

REMARKS.--Estimated daily discharges: Dec. 8 to Jan. 11, Jan. 26 to Feb. 4, Feb. 16-23, and Feb. 25 to Mar. 2. Records good except those for estimated daily discharges or discharges below 10,000 ft³/s, which are poor. Minor flow regulation caused by navigation dams. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform and gageheight telemeter at station.

AVERAGE DISCHARGE.--117 years, 47,550 ft³/s, 7.54 in/yr, 34,450,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 307,000 ft³/s Apr. 28, 1965; maximum gage height, 24.65 ft Apr. 28, 1965; minimum daily discharge, 6,500 ft³/s Dec. 25-27, 1933.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known since at least 1828, that of Apr. 28, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 123,000 ft³/s June 24; maximum gage height, 15.17 ft June 24; minimum daily discharge, 11,600 ft³/s Dec. 29, 30; minimum gage height, 8.30 ft Jan. 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17900	21500	23200	12200	17200	18600	45500	60000	56500	111000	53000	64500
2	18300	24000	23600	13000	17800	20600	44000	60400	53500	102000	52500	56800
3	17700	24900	26700	14000	18200	19800	43500	60300	52400	96600	55300	53900
4	18900	26800	23700	15500	18200	20700	43300	61500	51600	96800	58600	58200
5	18800	27000	17200	16700	19500	20800	42700	62300	53900	96400	61200	59900
6	16400	25900	16700	15800	16400	21400	40100	62500	53100	91900	59400	52800
7	17700	25600	20600	14800	19200	20300	37300	61900	53900	84700	54800	36600
8	17200	26900	20800	14500	18300	21400	33700	61000	56900	77100	55000	25000
9	17500	27200	20000	16000	17600	33400	31000	62400	60000	68800	54200	26300
10	16600	26600	18500	19000	22400	42200	31600	65800	61700	64000	54600	28300
11	18000	27100	16900	23200	24400	43700	37300	64100	62000	60400	51700	40000
12	15800	26100	14300	21500	24500	44900	43900	61000	61500	61100	48000	48900
13	15700	26900	12900	23900	23000	58400	41500	59700	59700	61300	42900	47400
14	16000	23200	13100	23800	22900	69700	38700	58000	61300	61900	37700	43800
15	16800	23300	13100	24000	25100	80600	37000	56600	71500	61700	30300	43200
16	16400	23300	13100	23300	21900	104000	33900	59000	68500	58000	28400	42700
17	17100	23300	12500	24200	21300	114000	30300	61100	72400	52000	26400	43600
18	17100	21900	13100	23200	21100	117000	27700	62700	79000	47600	31000	44500
19	17700	23100	12800	24500	21100	115000	26900	64100	89600	44400	36800	45800
20	19700	20900	12400	24700	20800	109000	23100	66900	94300	44200	50300	50700
21	19800	19900	12200	26500	18900	117000	22300	68100	101000	48000	60400	54000
22	19500	20900	12100	24700	19100	116000	21800	68500	112000	49000	61800	56000
23	18600	24000	12100	23500	19700	114000	22400	69600	119000	49300	58000	54900
24	19000	23500	12000	20900	20400	114000	24500	72400	123000	47700	62000	53500
25	17600	22800	12000	21400	18200	111000	30400	74800	121000	44500	66900	49100
26	17500	23100	12000	19600	18200	102000	36700	75900	116000	36500	75000	43300
27	17900	23400	11900	18000	18600	88700	46400	76200	111000	31600	87400	40200
28	17500	23400	11700	17600	18700	72600	52600	76400	101000	24100	90300	36000
29	18000	25600	11600	17300	---	63100	55000	75900	100000	34000	93600	31500
30	17600	24000	11600	17100	---	53100	58600	70700	115000	52000	91200	33200
31	20600	---	11900	17100	---	48200	---	62100	---	56300	82600	---
TOTAL	550900	726100	476300	611500	562700	2095200	1103700	2021900	2392300	1914900	1771300	1364600
MEAN	17770	24200	15360	19730	20100	67590	36790	65220	79740	61770	57140	45490
MAX	20600	27200	26700	26500	25100	117000	58600	76400	123000	111000	93600	64500
MIN	15700	19900	11600	12200	16400	18600	21800	56600	51600	24100	26400	25000
AC-FT	1093000	1440000	944700	1213000	1116000	4156000	2189000	4010000	4745000	3798000	3513000	2707000
CFSM	.21	.28	.18	.23	.23	.79	.43	.76	.93	.72	.67	.53
IN.	.24	.32	.21	.27	.24	.91	.48	.88	1.04	.83	.77	.59

CAL YR 1989 TOTAL 11205900 MEAN 30700 MAX 104000 MIN 11400 AC-FT 22230000 CFSM .36 IN. 4.87
WTR YR 1990 TOTAL 15591400 MEAN 42720 MAX 123000 MIN 11600 AC-FT 30930000 CFSM .50 IN. 6.78

WAPSIPINICON RIVER BASIN

05420560 WAPSIPINICON RIVER NEAR ELMA, IA

LOCATION.--Lat 43°14'34", long 92°31'48", in NW1/4 NW1/4 sec.8, T.97 N., R.14 W., Howard County, Hydrologic Unit 07080102, on right bank 10 ft downstream from bridge on county highway B17, 0.2 mi downstream from small left-bank tributary, 4.8 mi west of Elma, and at mile 217.9.

DRAINAGE AREA.--95.2 mi².

PERIOD OF RECORD.--October 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,130.05 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 14, 15, Nov. 17 to Mar. 9, Mar. 16-26, and July 28-30. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--32 years, 65.3 ft³/s, 9.32 in/yr, 47,310 acre-ft/yr; median of yearly mean discharges, 56 ft³/s, 8.0 in/yr, 40,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,100 ft³/s June 4, 1974, gage height, 14.94 ft, from high-water mark in well; maximum gage height, 15.38 ft, from high-water mark in well, probably occurred Aug. 22, 1979 (backwater from vegetation); minimum daily discharge, 1.9 ft³/s Feb. 4-8, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 15	1100	674	10.97	Aug. 21	0400	750	11.55
Aug. 4	0700	2,720	13.53	Aug. 25	1800	*6,180	*15.31

Minimum daily discharge, 3.0 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.1	13	7.9	4.9	6.7	10	23	52	31	44	57	84
2	5.4	12	8.1	5.0	5.4	13	24	45	29	35	47	74
3	5.5	11	8.4	5.4	5.9	12	24	40	30	29	275	67
4	5.7	11	7.6	5.6	6.6	11	23	37	30	25	1970	65
5	6.8	11	8.0	5.2	8.5	13	23	35	28	21	604	59
6	7.5	12	7.6	5.6	9.2	12	23	33	28	19	202	51
7	7.3	12	6.8	5.4	7.1	15	22	31	27	18	118	45
8	6.7	12	4.7	5.7	8.4	30	22	30	25	18	84	49
9	8.1	12	4.8	6.1	7.6	300	22	37	24	16	64	46
10	7.7	12	5.2	5.4	7.0	403	29	59	22	15	51	40
11	7.2	12	4.9	5.8	6.3	350	31	59	21	14	42	36
12	7.8	12	4.1	5.3	6.9	501	29	57	21	17	36	33
13	6.6	12	4.2	4.7	7.8	72	28	51	39	17	31	29
14	7.8	12	4.0	5.2	13	330	29	46	64	15	27	27
15	8.0	12	3.8	6.1	11	637	28	44	45	14	23	25
16	8.1	10	3.6	7.3	8.6	460	28	49	63	13	21	23
17	10	8.1	4.0	6.6	9.2	350	29	48	152	13	23	22
18	7.8	6.6	3.9	5.6	8.8	230	28	44	119	11	23	21
19	6.3	7.8	3.5	5.1	8.1	160	27	86	88	17	185	25
20	5.7	7.4	3.3	5.6	7.0	100	27	180	93	55	487	26
21	5.8	7.0	3.2	5.3	9.7	78	27	148	73	37	527	23
22	5.9	6.8	3.0	5.6	9.5	60	26	105	70	25	198	21
23	7.3	7.4	3.6	6.3	8.6	48	25	82	66	21	134	19
24	7.7	7.6	4.2	7.0	8.6	40	25	71	54	18	158	19
25	9.7	7.6	4.6	6.2	7.0	35	25	62	45	16	3450	18
26	10	8.8	5.0	5.6	7.7	30	26	57	38	49	2630	17
27	10	8.4	4.7	6.2	8.4	25	31	51	52	454	666	16
28	10	7.4	5.0	5.5	7.4	24	50	45	175	302	247	15
29	11	6.3	5.5	6.5	--	23	72	40	82	185	169	14
30	12	6.3	4.5	7.4	--	23	63	36	57	112	125	14
31	14	--	4.7	5.4	--	23	--	33	--	75	101	--
TOTAL	244.5	291.5	156.4	178.6	226.0	4418	889	1793	1691	1720	12775	1023
MEAN	7.89	9.72	5.05	5.76	8.07	143	29.6	57.8	56.4	55.5	412	34.1
MAX	14	13	8.4	7.4	13	637	72	180	175	454	3450	84
MIN	5.1	6.3	3.0	4.7	5.4	10	22	30	21	11	21	14
AC-FT	485	578	310	354	448	8760	1760	3560	3350	3410	25340	2030
CFSM	.08	.10	.05	.06	.08	1.50	.31	.61	.59	.58	4.33	.36
IN.	.10	.11	.06	.07	.09	1.73	.35	.70	.66	.67	4.99	.40

CAL YR 1989	TOTAL 4989.9	MEAN 13.7	MAX 300	MIN 3.0	AC-FT 9900	CFSM .14	IN. 1.95
WTR YR 1990	TOTAL 25406.0	MEAN 69.6	MAX 3450	MIN 3.0	AC-FT 50390	CFSM .73	IN. 9.93

WAPSIPINICON RIVER BASIN

75

05421000 WAPSIPINICON RIVER AT INDEPENDENCE, IA

LOCATION.--Lat 42°27'49", long 91°53'42", in SE1/4 sec.4, T.88 N., R.9 W., Buchanan County, Hydrologic Unit 07080102, on right bank at Sixth Street in Independence, 1,800 ft downstream from dam at abandoned hydroelectric plant, 4.9 mi downstream from Otter Creek, 9.7 mi upstream from Pine Creek, and at mile 142.5.

DRAINAGE AREA.--1,048 mi².

PERIOD OF RECORD.--July 1933 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1938-39, 1940 (M), 1947.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 882.85 ft above NGVD. Prior to May 24, 1941 nonrecording gage in tailrace of powerplant 1,800 ft upstream at datum 80.00 ft lower.

REMARKS.--No estimated daily discharges. Records good. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--57 years, 617 ft³/s, 8.00 in/yr, 447,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,800 ft³/s July 18, 1968, gage height, 21.11 ft; minimum daily discharge, 7.0 ft³/s for several days in 1934 and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1901, that of July 18, 1968.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 28	2130	4,710	8.38	Aug. 22	1100	4,170	7.99
July 31	0445	7,260	10.15	Aug. 26	0400	*24,400	*20.30

Minimum discharge, 39 ft³/s Dec. 25, 26, 27, 28

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	61	170	89	48	57	69	402	604	866	2690	6320	5440
2	65	188	85	48	55	75	372	598	770	1900	5660	3890
3	49	185	61	48	56	78	345	568	697	1440	4540	2750
4	48	184	72	53	53	79	343	540	655	1090	3470	2010
5	59	179	81	51	55	85	325	500	681	884	2450	1780
6	67	155	84	51	60	83	301	459	706	728	1590	1670
7	61	159	64	51	66	77	280	412	689	616	1200	1400
8	59	161	71	51	68	127	267	380	672	549	1020	1140
9	58	159	70	51	75	358	266	1100	622	469	1050	964
10	59	144	70	51	77	454	292	920	552	436	1090	839
11	54	146	63	56	75	606	297	837	480	421	1250	802
12	53	121	57	54	76	855	317	927	440	587	951	734
13	51	127	56	49	83	1060	336	968	414	805	708	646
14	52	123	55	51	70	1410	357	903	476	772	590	579
15	52	132	51	51	59	1710	368	831	813	710	511	520
16	62	111	48	52	69	1910	377	875	1430	597	454	470
17	69	85	48	59	67	2000	369	790	2700	493	472	436
18	101	82	48	60	66	2090	355	695	3170	418	672	430
19	112	101	48	59	66	1990	348	1710	2770	384	1120	443
20	104	110	48	62	64	1740	385	3200	2920	446	1820	429
21	96	97	48	60	64	1380	404	3200	2730	536	3280	447
22	90	99	46	60	66	1040	426	3060	2680	907	4050	450
23	92	84	44	61	69	850	424	3100	3530	1180	3780	419
24	88	84	42	61	69	749	415	2840	3540	1290	4150	397
25	81	110	41	62	65	670	387	2470	2990	1060	14900	307
26	68	96	39	58	71	598	362	2010	2570	765	22100	333
27	66	106	40	59	71	532	349	1660	2500	954	14700	343
28	75	91	41	55	67	489	367	1410	3850	2040	14000	329
29	82	67	44	56	---	462	418	1230	3820	5280	12100	312
30	119	85	46	58	---	434	542	1080	3170	6970	9340	299
31	124	---	48	54	---	410	---	998	---	7080	7140	---
TOTAL	2277	3741	1748	1700	1859	24470	10796	40875	53903	44497	146478	31008
MEAN	73.5	125	56.4	54.8	66.4	789	360	1319	1797	1435	4725	1034
MAX	124	188	89	62	83	2090	542	3200	3850	7080	22100	5440
MIN	48	67	39	48	53	69	266	380	414	384	454	299
AC-FT	4520	7420	3470	3370	3690	48540	21410	81080	106900	88260	290500	61500
CFSM	.07	.12	.05	.05	.06	.75	.34	1.26	1.71	1.37	4.51	.99
IN.	.08	.13	.06	.06	.07	.87	.38	1.45	1.91	1.58	5.20	1.10

CAL YR 1989 TOTAL 50702 MEAN 139 MAX 1790 MIN 18 AC-FT 100600 CFSM .13 IN. 1.80
WTR YR 1990 TOTAL 363352 MEAN 995 MAX 22100 MIN 39 AC-FT 720700 CFSM .95 IN. 12.90

WAPSIPINICON RIVER BASIN

05422000 WAPSIPINICON RIVER NEAR DE WITT, IA

LOCATION.--Lat $41^{\circ}46'01''$, long $90^{\circ}32'05''$, in SW1/4 NE1/4 sec.6, T.80 N., R.4 E., Clinton County, Hydrologic Unit 07080103, on left bank 5 ft upstream from bridge on old U.S. Highway 61, 0.9 mi downstream from Silver Creek, 4.0 mi south of water tower in De Witt, 6.2 mi upstream from Brophy Creek, and 18.2 mi upstream from mouth.

DRAINAGE AREA.--2,330 mi².

PERIOD OF RECORD.--June 1934 to current year.

REVISED RECORDS.--WSP 1308: 1937 (M). WSP 1438: Drainage area. WSP 1708: 1951.

GAGE.--Water-stage recorder. Datum of gage is 598.81 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 18-20, Dec. 5 to Feb. 5, Feb. 16-25, and June 17, 18. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U. S. Army Corps of Engineers gage-height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--56 years, 1,536 ft³/s, 8.95 in/yr, 1,113,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,100 ft³/s June 17, 1990, gage height, 14.19 ft; minimum daily discharge, 46 ft³/s Jan. 22, 23, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 17	1100	*31,100	*14.19	Aug. 21	1615	7,950	11.76
June 30	1000	19,500	13.11	Sept. 1	1215	19,200	13.06
Aug. 19	0530	7,750	11.64				

Minimum daily discharge, 96 ft³/s Dec. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	278	235	194	117	215	339	1230	803	2700	11200	2620	19000
2	267	238	188	119	220	351	1170	775	2430	8960	3400	17700
3	256	234	138	122	215	336	1110	780	2260	7920	4120	15600
4	250	246	178	132	225	333	1080	1020	2040	6780	5000	13300
5	252	268	216	140	245	326	1030	1860	1980	5010	5380	10900
6	255	289	250	135	263	316	975	2000	2030	3600	5680	9160
7	251	303	183	130	267	296	931	1750	1810	2920	5790	8300
8	244	306	165	140	269	327	913	1500	1930	2470	5070	6050
9	239	311	160	150	298	628	892	1350	2190	2130	3260	3850
10	235	313	170	160	323	758	885	1240	1970	1960	2360	3220
11	233	304	165	160	323	1270	860	1110	1740	1930	1940	2760
12	228	294	150	155	325	1650	822	1330	1640	1770	1740	2410
13	225	302	140	152	343	1540	802	2440	1470	1530	1780	2150
14	221	305	135	160	311	1980	827	2410	1890	1400	1680	1960
15	218	294	128	170	277	3790	835	2150	1880	1460	1530	1790
16	212	287	125	185	260	4770	828	2130	6030	1530	1320	1640
17	211	274	122	200	255	3630	828	2320	24600	1540	3290	1490
18	212	200	120	210	250	3380	817	2400	19200	1420	6810	1380
19	209	215	118	210	250	3210	809	2600	14400	1370	6880	1300
20	211	250	115	215	255	3090	841	2360	12600	1330	6750	1240
21	212	298	114	220	260	3070	877	2390	9470	1270	7550	1260
22	214	280	113	215	265	3060	876	3300	8450	1510	6130	1210
23	219	261	108	210	270	2840	883	4080	8690	1620	4510	1120
24	225	254	105	210	265	2510	895	4400	8540	1380	4400	1070
25	230	256	100	210	268	2170	898	4690	8120	1330	4740	1050
26	229	250	96	205	282	1890	895	5400	7510	1430	5520	1010
27	227	252	98	210	313	1700	898	5240	7130	1520	6040	965
28	224	254	102	205	316	1560	915	4650	7250	1520	6580	918
29	224	232	107	200	---	1450	899	4050	10700	1680	7080	842
30	225	214	110	205	---	1370	852	3550	16900	1560	8700	814
31	231	---	114	210	---	1280	---	3060	---	2040	16800	---
TOTAL	7167	8019	4327	5462	7628	55220	27373	79138	199550	85090	154450	135459
MEAN	231	267	140	176	272	1781	912	2553	6652	2745	4982	4515
MAX	278	313	250	220	343	4770	1230	5400	24600	11200	16800	19000
MIN	209	200	96	117	215	296	802	775	1470	1270	1320	814
AC-FT	14220	15910	8580	10830	15130	109500	54290	157000	395800	168800	306400	268700
CFSM	.10	.11	.06	.08	.12	.76	.39	1.10	2.85	1.18	2.14	1.94
IN.	.11	.13	.07	.09	.12	.88	.44	1.26	3.19	1.36	2.47	2.16

CAL YR 1989	TOTAL 138193	MEAN 379	MAX 1810	MIN 96	AC-FT 274100	CFSM .16	IN. 2.21
WTR YR 1990	TOTAL 76883	MEAN 2107	MAX 24600	MIN 96	AC-FT 1525000	CFSM .90	IN. 12.28

CROW CREEK BASIN

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05422470 CROW CREEK AT BETTENDORF, IA

LOCATION.--Lat $41^{\circ}33'03''$, long $90^{\circ}27'15''$, in NW1/4 NW1/4 sec. 24, T. 78 N., R. 4 E., Scott County, Hydrologic Unit 07080101, on left bank 200 ft upstream from bridge on Valley Road (old U.S. Highway 67), 3.5 mi east of U.S. Highway 6, and 0.7 mi upstream from mouth.

DRAINAGE AREA.--17.8 mi².

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 576.23 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 11 to Jan. 11, Jan. 21, 24, 25, 27-29, Jan. 31 to Feb. 5, Feb. 8-10, 15, 16, 19, 20, 22-26, Feb. 28 to Mar. 2, and Feb. 22 to Mar. 6. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--13 years, 15.6 ft³/s, 11.9 in/yr, 11,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,700 ft³/s June 16, 1990, gage height, 11.03 ft; minimum discharge, 0.06 ft³/s Aug. 18, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 11	0815	487	5.52	June 17	0530	1,570	7.43
Mar. 14	2115	582	5.78	June 19	2245	721	6.05
May 4	1800	392	5.35	June 29	0515	6,090	10.42
June 8	0600	465	5.52	Aug. 3	2345	438	5.42
June 14	0645	543	5.73	Aug. 17	1200	1,190	7.95
June 16	1145	*7,700	*11.03	Aug. 19	2215	2,190	9.28

Minimum daily discharge, 0.52 ft³/s Dec. 22, 23.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.4	1.3	1.1	1.4	2.0	5.5	15	8.8	20	51	8.0	21
2	2.4	1.3	1.0	1.4	1.9	5.8	14	8.3	20	33	8.1	19
3	2.6	1.1	1.1	1.6	1.9	6.3	12	8.6	18	36	53	17
4	2.3	1.4	.96	1.7	2.1	5.4	13	157	16	31	84	16
5	5.9	1.1	1.0	1.6	2.5	6.8	12	56	19	25	19	15
6	4.9	1.1	1.0	1.5	3.4	7.7	11	41	23	22	15	14
7	2.8	1.5	.85	1.4	3.3	5.3	9.5	32	19	21	12	12
8	2.7	1.6	.88	1.7	3.0	36	7.9	28	103	19	11	11
9	2.5	1.1	.88	2.0	2.9	33	6.6	31	35	17	9.5	11
10	2.4	1.3	.88	2.2	2.6	52	7.9	30	26	33	8.5	9.7
11	2.7	1.3	.82	2.2	2.8	160	7.0	25	22	59	8.1	8.7
12	2.4	1.2	.75	2.1	2.9	40	6.5	40	19	27	40	8.1
13	2.5	1.2	.72	2.0	2.9	39	7.7	42	19	21	42	7.4
14	2.5	1.2	.70	2.0	2.7	102	12	33	140	21	16	6.3
15	2.5	1.2	.60	2.0	2.2	118	8.1	32	37	19	14	5.8
16	1.8	1.1	.62	3.0	2.2	66	7.3	30	1660	25	12	5.7
17	2.5	1.1	.60	3.1	2.7	66	7.0	24	584	18	590	5.3
18	2.7	.99	.58	2.4	2.7	59	6.5	22	83	16	419	5.4
19	2.0	1.0	.57	1.8	2.4	53	6.5	24	126	16	547	5.4
20	2.0	1.2	.57	1.8	2.5	50	16	20	98	21	681	5.3
21	2.0	1.2	.54	2.0	3.1	47	13	18	53	16	97	22
22	1.6	1.2	.52	1.9	6.0	46	11	16	82	15	66	7.7
23	1.4	1.1	.52	1.9	7.0	42	9.9	16	56	13	53	5.9
24	1.3	.99	.54	1.8	6.5	37	9.1	20	41	12	43	5.0
25	1.3	.99	.58	1.8	6.0	34	9.1	66	36	11	60	5.4
26	1.2	1.0	.56	1.5	5.2	27	8.7	37	43	10	39	4.8
27	1.3	1.2	.56	1.6	5.2	24	12	30	33	11	33	4.3
28	1.4	1.2	.62	1.7	5.8	21	18	26	48	11	30	4.2
29	1.4	1.4	.80	1.8	--	20	11	24	1150	13	28	4.0
30	2.7	1.1	1.1	2.0	--	18	10	22	91	9.9	26	4.0
31	2.1	--	1.4	1.9	--	16	--	20	--	8.7	21	--
TOTAL	72.2	35.67	23.92	58.8	96.4	1248.8	305.3	987.7	4720	661.6	3093.2	276.4
MEAN	2.33	1.19	.77	1.90	3.44	40.3	10.2	31.9	157	21.3	99.8	9.21
MAX	5.9	1.6	1.4	3.1	7.0	160	18	157	1660	59	681	22
MIN	1.2	.99	.52	1.4	1.9	5.3	6.5	8.3	16	8.7	8.0	4.0
AC-FT	143	71	47	117	191	2480	606	1960	9360	1310	6140	548
CFSM	.13	.07	.04	.11	.19	2.26	.57	1.79	8.84	1.20	5.61	.52
IN.	.15	.07	.05	.12	.20	2.61	.64	2.06	9.86	1.38	6.46	.58

CAL YR 1989 TOTAL 1258.93 MEAN 3.45 MAX 92 MIN .25 AC-FT 2500 CFSM .19 IN. 2.63
WTR YR 1990 TOTAL 11579.99 MEAN 31.7 MAX 1660 MIN .52 AC-FT 22970 CFSM 1.78 IN. 24.20

IOWA RIVER BASIN

05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IA

LOCATION.--Lat 43°00'31", long 93°37'42", in NE1/4 NW1/4 sec.36, T.95 N., R.24 W., Hancock County, Hydrologic Unit 07080207, on left bank 15 ft upstream from bridge on county highway B55, 1.2 mi west of Chicago, Rock Island and Pacific Railroad crossing in Klemme, 1.5 mi upstream from Drainage ditch 9, 18.2 mi upstream from confluence with West Branch Iowa River, and at mile 341.0.

DRAINAGE AREA.--133 mi².

PERIOD OF RECORD.--April 1948 to September 1976, June 1977 to current year. Prior to October 1958, published as East Fork Iowa River near Klemme.

REVISED RECORDS.--WSP 1438: Drainage area. WDR IA-80-1: 1978.

GAGE.--Water-stage recorder. Datum of gage is 1,179.33 ft above NGVD. Apr. 1, 1948, to Sept. 30, 1955, nonrecording gage at site 0.6 mi upstream at datum 0.80 ft higher. Oct. 1, 1955, to Sept. 30, 1969, at present site at datum 0.31 ft lower.

REMARKS.--Estimated daily discharges: Nov. 16 to Mar. 13. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--41 years (water years 1948-76, 1978-90), 64.1 ft³/s, 6.54 in/yr, 46,440 acre-ft/yr; median of yearly mean discharges, 52 ft³/s, 5.3 in/yr, 37,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,960 ft³/s June 19, 1954, gage height, 11.2 ft, from flood-mark, site and datum then in use; maximum gage height, 10.67 ft Apr. 6, 1965 (corrected), backwater from ice; minimum daily discharge, no flow Dec. 21, 1989 to Jan. 7, 1990.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1944 reached a stage of about 10 ft, from information by local residents, former site and datum.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
July 29	0600	*804	*8.51			700	7.97

No flow Dec. 21 to Jan. 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.7	1.8	2.4	.00	.45	1.0	12	16	8.1	59	443	124
2	2.8	1.8	2.4	.00	.40	.94	10	16	8.9	48	328	102
3	2.7	1.8	2.0	.00	.35	.80	10	15	10	38	264	92
4	2.7	1.9	2.1	.00	.50	.94	9.8	14	7.9	30	265	77
5	2.7	1.9	1.9	.00	.74	.90	9.5	14	8.2	21	220	66
6	2.7	1.9	2.1	.00	.78	1.5	9.6	14	7.6	16	155	57
7	2.6	1.9	1.6	.00	.70	8.0	7.9	12	7.2	15	117	51
8	2.7	1.8	1.3	.12	.76	35	7.8	8.1	7.3	15	92	131
9	1.6	1.8	1.0	.14	.82	124	8.2	9.2	6.4	13	71	125
10	1.7	1.7	1.1	.12	.76	96	15	7.5	5.7	12	55	94
11	2.0	1.7	.70	.15	.71	63	11	7.3	6.6	12	43	76
12	2.3	1.7	.40	.13	.77	51	9.7	7.1	6.6	28	31	64
13	2.0	1.7	.42	.11	.80	42	9.7	7.0	8.4	20	21	55
14	2.0	1.7	.35	.11	1.1	55	9.5	6.2	7.7	22	16	47
15	2.0	1.6	.26	.14	.90	46	9.5	6.4	9.6	22	14	39
16	2.6	1.5	.19	.17	.74	38	9.3	9.0	36	17	12	33
17	2.3	1.2	.20	.14	.78	22	9.3	6.3	155	14	51	28
18	2.0	1.1	.25	.13	.68	14	9.3	6.5	140	18	61	33
19	4.6	1.4	.19	.12	.63	12	9.2	40	150	191	55	35
20	5.1	1.7	.15	.16	.60	10	8.7	52	162	518	67	36
21	2.6	1.7	.00	.15	.65	9.3	8.7	49	116	566	84	36
22	2.2	1.8	.00	.16	.62	17	8.7	35	102	448	69	32
23	3.1	1.4	.00	.21	.70	14	8.6	26	182	306	57	27
24	4.2	1.8	.00	.25	.66	16	22	17	154	211	48	25
25	2.5	2.0	.00	.24	.58	12	61	18	108	159	413	24
26	1.7	2.2	.00	.22	.73	11	35	17	82	169	684	19
27	1.5	2.4	.00	.28	.70	13	27	13	65	373	625	18
28	1.6	2.3	.00	.26	.80	13	26	11	67	697	474	17
29	1.7	1.9	.00	.31	---	12	25	11	92	793	313	16
30	2.2	2.2	.00	.39	---	12	20	9.2	77	707	212	15
31	1.9	---	.00	.34	---	12	---	8.1	---	573	158	---
TOTAL	77.0	53.3	21.01	4.55	19.41	763.38	437.0	487.9	1804.2	6131	5518	1594
MEAN	2.48	1.78	.68	.15	.69	24.6	14.6	15.7	60.1	198	178	53.1
MAX	5.1	2.4	2.4	.39	1.1	124	61	52	182	793	684	131
MIN	1.5	1.1	.00	.00	.35	.80	7.8	6.2	5.7	12	12	15
AC-FT	153	106	42	9.0	.38	1510	867	968	3580	12160	10940	3160
CFSM	.02	.01	.01	.00	.01	.19	.11	.12	.45	1.49	1.34	.40
IN.	.02	.01	.01	.00	.01	.21	.12	.14	.50	1.71	1.54	.45

CAL YR 1989 TOTAL 2935.01 MEAN 8.04 MAX 130 MIN .00 AC-FT 5820 CFSM .06 IN. .82
WTR YR 1990 TOTAL 16910.75 MEAN 46.3 MAX 793 MIN .00 AC-FT 33540 CFSM .35 IN. 4.73

IOWA RIVER BASIN

79

05449500 IOWA RIVER NEAR ROWAN, IA

LOCATION.--Lat 42°45'36", long 93°37'23", in NW1/4 NE1/4 sec.25, T.92 N., R.24 W., Wright County, Hydrologic Unit 07080207, on left bank 10 ft downstream from bridge on county highway C38, 0.9 mi downstream from drainage ditch 123, 3.8 mi northwest of Rowan, 10.7 mi downstream from confluence of East and West Branches, and at mile 316.4.

DRAINAGE AREA.--429 mi².

PERIOD OF RECORD.--October 1940 to September 1976, June 1977 to current year.

REVISED RECORDS.--WSP 1308: 1942-43 (M). WSP 1438: Drainage area. WDR IA-80-1: 1978.

GAGE.--Water-stage recorder. Datum of gage is 1,143.35 ft above NGVD. Prior to Oct. 14, 1948, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 17, 18, and Dec. 7 to Mar. 6. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--49 years (water years 1941-76, 1978-90), 210 ft³/s, 6.65 in./yr, 152,100 acre-ft/yr; median of yearly mean discharges, 190 ft³/s, 6.0 in./yr, 138,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,460 ft³/s June 21, 1954, gage height, 14.88 ft; minimum daily discharge, 2.8 ft³/s Dec. 22, 1990.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft³/s and maximum (*):

Date July 29	Time 0615	Discharge (ft ³ /s)	Gage height (ft)	Date No other peak greater than base discharge.	Discharge (ft ³ /s)	Gage height (ft)
		*1,760	*10.84			

Minimum daily discharge, 2.8 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.6	10	10	4.2	5.4	12	34	40	67	421	1470	446
2	7.2	9.7	10	5.6	5.0	11	35	35	65	283	1220	350
3	7.1	9.1	10	6.0	5.4	10	37	32	87	207	966	296
4	6.7	9.1	11	5.8	5.9	12	31	30	123	160	751	256
5	7.3	9.1	11	6.0	6.4	11	29	29	148	130	644	220
6	7.9	9.1	10	5.8	6.1	13	29	28	174	107	537	187
7	7.1	11	8.2	6.9	6.6	15	29	27	132	91	424	163
8	7.0	10	8.1	6.4	7.2	43	28	25	107	80	347	177
9	7.6	9.5	8.9	5.8	7.8	92	29	31	89	70	292	233
10	7.5	9.3	6.3	6.4	8.3	79	44	44	75	62	247	225
11	7.9	9.5	5.1	5.7	8.0	88	44	57	63	57	213	185
12	7.2	9.5	4.3	5.2	9.0	86	44	60	56	60	180	158
13	7.0	9.5	4.5	5.4	7.1	103	37	54	97	63	157	138
14	7.2	9.6	4.4	5.7	6.5	123	37	47	199	63	138	122
15	7.9	9.3	4.0	6.6	5.8	141	37	43	152	59	122	112
16	10	9.2	3.5	5.8	6.0	121	35	50	200	55	111	105
17	8.1	8.2	3.6	5.0	5.8	92	35	53	540	49	113	99
18	7.7	8.4	3.6	5.2	6.4	70	34	52	773	44	149	100
19	8.3	8.8	3.7	5.0	6.2	45	33	222	716	192	219	106
20	8.4	9.1	3.3	4.8	7.4	43	32	432	724	870	319	107
21	8.1	9.2	2.9	4.6	9.0	41	33	385	667	1130	280	104
22	10	8.4	2.8	5.2	8.6	43	31	291	572	1140	260	101
23	9.4	9.3	3.2	5.6	9.2	40	29	217	644	1020	226	97
24	8.4	9.2	3.4	4.8	8.4	38	29	169	593	804	195	92
25	7.8	9.6	4.1	4.5	7.4	36	50	143	481	565	409	87
26	8.1	9.3	3.7	5.2	9.4	39	105	127	360	479	853	85
27	9.9	9.7	4.1	4.5	8.8	37	81	121	288	820	1020	81
28	9.3	11	4.5	4.9	9.0	35	63	109	262	1530	1080	78
29	8.5	11	4.2	5.2	---	35	52	96	638	1750	1040	74
30	9.2	11	3.9	4.4	---	34	44	83	641	1730	904	71
31	11	---	4.0	6.2	---	33	---	74	---	1670	644	---
TOTAL	252.4	284.7	174.3	168.4	202.1	1621	1210	3206	9733	15761	15530	4655
MEAN	8.14	9.49	5.62	5.43	7.22	52.3	40.3	103	324	508	501	155
MAX	11	11	11	6.9	9.4	141	105	432	773	1750	1470	446
MIN	6.7	8.2	2.8	4.2	5.0	10	28	25	56	44	111	71
AC-FT	501	565	346	334	401	3220	2400	6360	19310	31260	30800	9230
CFSM	.02	.02	.01	.01	.02	.12	.09	.24	.76	1.19	1.17	.36
IN.	.02	.02	.02	.01	.02	.14	.10	.28	.84	1.37	1.35	.40

CAL YR 1989 TOTAL 11321.9 MEAN 31.0 MAX 470 MIN 2.8 AC-FT 22460 CFSM .07 IN. .98
WTR YR 1990 TOTAL 52797.9 MEAN 145 MAX 1750 MIN 2.8 AC-FT 104700 CFSM .34 IN. 4.58

IOWA RIVER BASIN

05451500 IOWA RIVER AT MARSHALLTOWN, IA

LOCATION.--Lat 42°03'57", long 92°54'27", in SE1/4 SE1/4 sec.23, T.84 N., R.18 W., Marshall County, Hydrologic Unit 07080208, on right bank 10 ft downstream from bridge on State Highway 14, 1,500 ft upstream from Burnett Creek, 2.2 mi upstream from Linn Creek, and at mile 222.8.

DRAINAGE AREA.--1,564 mi², including that of Burnett Creek.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1902 to September 1903, October 1914 to September 1927, October 1932 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1915-18, 1919 (M), 1920, 1921-23 (M), 1924-27, 1933, 1934 (M), 1936, 1938, 1947 (M).

GAGE.--Water-stage recorder. Datum of gage is 853.10 ft above NGVD. See WSP 1728 for history of changes prior to Sept. 21, 1934.

REMARKS.--Estimated daily discharges: Oct. 1, 2, Nov. 14 to Mar. 8, and Aug. 24. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--72 years (water years 1903, 1915-27, 1933-90), 812 ft³/s, 7.05 in/yr, 588,300 acre-ft/yr; median of yearly mean discharges, 710 ft³/s, 6.2 in/yr, 514,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,000 ft³/s June 4, 1918, gage height, 17.74 ft, from flood-mark, from rating curve extended above 19,000 ft³/s on basis of velocity-area study; maximum gage height, 20.47 ft June 18, 1990; minimum daily discharge, 4.7 ft³/s Jan. 25, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 19	---	5,740	16.54	July 28	2400	10,900	18.78
June 18	0145	*17,300	*20.38				

Minimum daily discharge, 22 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	76	47	30	37	96	358	639	1250	2120	4570	2000
2	42	82	42	33	35	90	342	553	1160	2040	4230	1850
3	34	78	41	32	40	98	327	503	1090	1900	3900	1580
4	34	78	45	30	50	90	311	470	1050	1590	3590	1330
5	40	79	50	31	60	88	307	438	1170	1620	3100	1130
6	37	75	40	28	56	84	303	419	1170	1420	2590	1000
7	44	73	32	31	64	120	292	386	1050	1190	2230	903
8	51	71	34	33	62	1500	278	361	1090	1050	1840	1100
9	45	69	35	31	58	2200	273	1290	1060	953	1540	1040
10	42	67	29	35	56	962	273	2120	980	909	1950	943
11	39	65	24	32	68	926	278	1550	908	964	2350	867
12	37	64	25	30	84	1140	274	1340	842	2150	1590	873
13	35	63	26	35	78	1170	288	1130	851	4210	1290	811
14	35	62	24	40	68	1220	304	969	1650	2450	1160	721
15	36	60	25	48	70	1920	306	1630	2280	1890	1170	685
16	46	47	27	44	68	1970	275	1640	4480	1520	947	646
17	49	49	26	42	66	1750	271	1000	10400	1280	879	606
18	60	47	25	37	74	1350	262	798	14500	1110	873	606
19	54	60	23	39	70	1020	257	3050	8740	1330	764	686
20	52	58	24	35	76	843	269	5280	8960	3090	1410	711
21	52	54	24	37	88	723	266	4410	7130	2170	1420	680
22	51	48	22	39	82	641	260	3910	6580	2170	1200	654
23	49	49	24	40	94	571	254	3560	7390	2100	1110	612
24	46	52	28	35	88	529	248	3390	6130	2060	1100	588
25	45	48	31	33	82	494	236	3840	5120	2020	2990	582
26	44	50	29	37	98	476	230	3570	4230	2370	4010	560
27	43	52	32	35	92	444	268	2740	3560	4390	2580	536
28	50	37	34	36	90	417	503	2240	3020	8970	2140	513
29	50	40	33	38	--	401	880	1860	2690	9540	1910	493
30	54	43	29	35	--	386	761	1590	2320	6550	2210	480
31	60	--	31	39	--	371	--	1380	--	5060	2150	--
TOTAL	1410	1796	961	1100	1954	24090	9754	58056	112851	82186	64793	25786
MEAN	45.5	59.9	31.0	35.5	69.8	777	325	1873	3762	2651	2090	860
MAX	60	82	50	48	98	2200	880	5280	14500	9540	4570	2000
MIN	34	37	22	28	35	84	230	361	842	909	764	480
AC-FT	2800	3560	1910	2180	3880	47780	19350	115200	223800	163000	128500	51150
CFSM	.03	.04	.02	.02	.04	.50	.21	1.20	2.41	1.70	1.34	.55
IN.	.03	.04	.02	.03	.05	.57	.23	1.38	2.68	1.95	1.54	.61

CAL YR 1989 TOTAL 37655 MEAN 103 MAX 850 MIN 22 AC-FT 74690 CFSM .07 IN. .90
WTR YR 1990 TOTAL 384737 MEAN 1054 MAX 14500 MIN 22 AC-FT 763100 CFSM .67 IN. 9.15

IOWA RIVER BASIN

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05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1988 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April 1988 to current year.

WATER TEMPERATURES: April 1988 to current year.

SUSPENDED-SEDIMENT DISCHARGE: April 1988 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at times of analysis. During periods of partial ice cover, sediment samples are collected in open water channel.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 805 microsiemens May 13, 1990; minimum daily, 270 microsiemens June 17, 1990.

WATER TEMPERATURES: Maximum daily, 34.0°C July 27, 1988; minimum daily, 0.0°C on many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 4,960 mg/L Mar. 19, 1990; minimum daily mean, 2 mg/L Aug. 8, 16, 1988.

SEDIMENT LOADS: Maximum daily, 60,700 tons June 17, 1990; minimum daily, 0.20 ton Aug. 8, 16, 1988.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 805 microsiemens May 13; minimum daily, 270 microsiemens June 17.

WATER TEMPERATURES: Maximum daily, 28.0°C Sep. 7; minimum daily, 0.0°C on many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 4,960 mg/L May 13; minimum daily mean, 7 mg/L Feb. 15, 20.

SEDIMENT LOADS: Maximum daily, 60,700 tons June 17; minimum daily, 1.3 tons Dec. 14, Feb. 15.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	531	---	---	---	679	600	674	630	631
2	---	---	---	---	481	620	---	640	---	---	---	633
3	---	---	---	---	477	652	615	590	---	---	---	633
4	---	665	---	---	476	---	625	609	640	641	594	---
5	---	---	---	---	---	584	636	710	726	614	600	600
6	550	---	---	679	---	---	585	---	715	---	651	651
7	669	---	---	---	---	551	694	595	---	607	---	---
8	578	621	---	---	---	564	655	650	665	633	---	---
9	---	516	574	---	---	320	---	459	550	641	---	652
10	---	579	---	457	343	557	571	590	---	627	---	---
11	---	---	---	450	417	---	778	580	---	556	634	634
12	519	492	---	---	433	545	761	700	383	601	---	---
13	---	---	---	---	458	515	805	615	587	---	568	568
14	518	546	---	---	516	547	701	595	654	---	562	562
15	---	---	---	---	520	636	714	630	645	531	---	---
16	---	---	---	---	653	581	594	345	---	---	585	585
17	511	---	618	482	490	655	583	---	270	701	---	---
18	---	---	---	---	481	699	687	662	360	---	---	---
19	---	---	---	549	---	711	578	330	440	---	---	619
20	550	---	---	---	565	732	564	---	515	428	---	---
21	---	---	---	512	676	612	---	606	682	---	---	---
22	609	---	---	---	676	643	---	543	785	---	584	584
23	---	---	553	---	700	674	---	632	661	604	587	587
24	---	---	---	---	674	532	---	693	---	---	---	---
25	612	---	579	---	499	728	616	---	758	674	467	581
26	---	547	---	---	579	581	---	693	678	522	599	599
27	---	---	---	547	579	548	---	670	704	599	---	---
28	637	---	---	521	---	652	577	---	661	337	747	---
29	---	---	---	---	662	556	---	---	482	---	---	---
30	---	---	---	---	620	730	---	---	---	630	518	518
31	593	---	---	---	---	615	---	---	---	588	---	---

IOWA RIVER BASIN
05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued
WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	1.0	---	---	---	14.0	19.5	24.0	21.0	21.5
2	---	---	---	---	2.0	8.0	---	19.0	---	---	---	23.5
3	---	---	---	---	2.0	10.0	13.0	13.5	---	---	---	24.5
4	---	10.0	---	---	1.0	---	12.5	11.0	15.5	25.0	22.0	---
5	---	---	---	---	---	9.5	11.0	16.0	24.5	20.0	---	---
6	14.0	---	---	---	---	---	---	14.5	---	24.0	---	27.0
7	8.0	---	---	---	---	10.0	18.5	15.5	---	23.0	23.0	28.0
8	16.0	8.0	---	---	3.0	9.0	20.0	19.0	24.5	23.0	---	---
9	8.0	1.0	---	---	5.0	---	14.0	19.5	24.5	---	---	24.5
10	---	---	.0	---	1.0	5.0	10.0	11.0	20.0	---	23.0	---
11	---	---	---	---	.0	8.0	---	13.5	22.0	---	23.0	26.5
12	18.0	8.0	---	---	---	11.0	---	11.0	24.0	15.5	20.5	---
13	---	---	---	---	---	11.0	6.5	15.5	23.0	22.0	---	26.0
14	20.0	8.0	---	---	---	10.5	6.5	14.5	22.0	19.0	---	22.0
15	---	---	---	---	---	8.0	11.0	14.0	22.0	16.5	22.0	---
16	---	---	---	---	---	5.0	8.0	15.5	19.5	---	---	15.5
17	9.0	---	.0	1.0	.0	4.5	10.0	---	20.0	23.0	---	---
18	---	---	---	---	1.0	2.5	11.5	18.5	23.0	---	---	---
19	---	---	---	1.0	---	3.5	10.0	14.0	19.0	---	---	17.5
20	9.0	---	---	---	1.0	8.0	12.0	12.5	21.0	19.0	---	---
21	---	---	---	---	2.0	12.0	15.0	10.5	19.0	21.0	---	---
22	15.0	---	---	---	---	12.0	16.5	13.5	17.0	19.5	---	14.0
23	---	---	---	1.0	---	3.0	16.0	15.5	19.0	23.0	25.0	11.0
24	---	---	---	---	---	5.0	22.0	14.0	20.0	---	---	---
25	21.0	---	.0	---	.0	6.5	18.0	13.5	20.0	23.5	23.0	15.5
26	---	1.0	---	---	---	8.0	18.0	14.0	21.5	20.0	23.0	21.0
27	---	---	---	---	1.0	9.0	17.0	15.0	23.0	19.0	24.5	---
28	16.0	---	---	.0	---	6.5	12.5	---	23.0	21.0	26.0	---
29	---	---	---	---	---	5.5	10.5	16.0	---	21.5	---	---
30	---	---	---	---	---	6.0	13.5	---	---	---	25.0	12.0
31	11.0	---	---	---	---	8.0	---	---	---	21.0	---	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD
	TRATION (MG/L)	(TONS/ DAY)	TRATION (MG/L)	(TONS/ DAY)	TRATION (MG/L)	(TONS/ DAY)	TRATION (MG/L)	(TONS/ DAY)	TRATION (MG/L)	(TONS/ DAY)	TRATION (MG/L)	(TONS/ DAY)
OCTOBER												MARCH
1	31	4.5	33	6.8	21	2.7	24	1.9	33	3.3	10	2.6
2	31	3.5	30	6.6	21	2.4	25	2.2	35	3.3	10	2.4
3	31	2.8	30	6.2	21	2.3	24	2.1	32	3.5	11	2.9
4	31	2.8	35	7.4	21	2.6	26	2.1	48	6.5	13	3.2
5	32	3.4	30	6.5	21	2.8	25	2.1	22	3.6	14	3.3
6	32	3.1	28	5.7	20	2.2	27	2.0	20	3.0	14	3.2
7	44	5.4	32	6.3	23	2.0	24	2.0	20	3.5	30	9.7
8	45	6.2	41	8.0	32	2.9	24	2.1	20	3.3	517	2090
9	30	3.6	69	13	35	3.3	24	2.0	20	3.1	332	2210
10	29	3.3	62	11	41	3.2	24	2.3	28	4.2	134	354
11	29	3.0	43	7.6	29	1.9	24	2.1	18	3.3	208	590
12	28	2.8	47	8.0	23	1.6	24	1.9	20	4.5	157	488
13	27	2.6	39	6.6	21	1.5	25	2.4	21	4.4	240	772
14	29	2.8	97	16	20	1.3	27	2.9	17	3.1	241	899
15	27	2.7	79	13	22	1.5	22	2.9	7	1.3	562	2920
16	29	3.7	42	5.3	41	3.0	22	2.6	8	1.5	342	1820
17	28	3.7	28	3.7	86	6.0	27	3.1	12	2.1	274	1300
18	26	4.3	28	3.6	59	4.0	24	2.4	29	5.8	152	565
19	20	2.9	28	4.5	43	2.7	35	3.7	9	1.7	117	322
20	20	2.8	28	4.4	35	2.3	26	2.5	7	1.4	57	131
21	18	2.5	28	4.1	27	1.7	26	2.6	31	7.4	66	128
22	17	2.3	28	3.6	24	1.4	25	2.6	17	3.8	64	111
23	16	2.2	27	3.6	24	1.6	93	10	16	4.1	48	74
24	17	2.1	25	3.5	24	1.8	82	7.7	14	3.3	42	60
25	33	4.1	25	3.2	25	2.1	39	3.5	15	3.3	32	43
26	25	3.0	25	3.4	25	2.0	36	3.6	10	2.6	57	73
27	23	2.6	25	3.5	25	2.2	34	3.2	9	2.2	39	47
28	40	5.5	23	2.3	25	2.3	31	3.0	9	2.2	42	47
29	32	4.4	21	2.3	25	2.2	29	3.0	---	---	36	39
30	31	4.5	21	2.4	27	2.1	33	3.1	---	---	47	49
31	36	5.9	---	---	25	2.1	31	3.3	---	---	68	68
TOTAL	---	109.0	---	182.1	---	73.7	---	92.9	---	95.3	---	15227.3

05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

IOWA RIVER BASIN
05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued
WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-	SEDI-	SED.	SED.
		CHARGE, INST. CUBIC FEET PER WATER (DEG C) (00010)	MENT, SEDIMENT, (MG/L) (80154)	DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	FALL, DIAM. SUS- PENDED THAN .002 MM (70337)
MAR 13...	1255	12.0	1280	284	982
APR 24...	1700	21.0	241	57	37
MAY 10...	1310	11.0	1990	622	3340
20...	1355	14.0	5300	867	12400
JUN 18...	1310	23.0	14200	75	2880
JUL 13...	1315	22.0	4350	582	6840
29...	1225	23.0	9070	424	10400
SEP 19...	1100	--	545	112	165
		SED. SUSP. FALL DIAM. % FINE THAN .008 MM	SED. SUSP. FALL DIAM. % FINE THAN .016 MM	SED. SUSP. FALL DIAM. % FINE THAN .062 MM	SED. SUSP. FALL DIAM. % FINE THAN .500 MM
		(70339)	(70340)	(70342)	(70343)
MAR 13...	--	--	--	--	--
APR 24...	--	--	--	--	--
MAY 10...	75	89	95	97	100
20...	65	77	95	97	99
JUN 18...	--	--	48	55	83
JUL 13...	50	62	94	97	100
29...	--	--	94	96	99
SEP 19...	--	--	--	--	--

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED-MATERIAL, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	BED	BED	BED	BED	BED	BED	BED	BED
		NUMBER OF SAM- PLING POINTS (COUNT)	MAT. SIEVE						
APR 24...	1720	5	0	1	7	54	85	94	98
MAY 20...	1415	5	27	31	43	80	94	98	100

IOWA RIVER BASIN

85

05451700 TIMBER CREEK NEAR MARSHALLTOWN, IA

LOCATION.--Lat 42°00'25", long 92°51'15", in SE1/4 SW1/4 sec. 8, T.83 N., R.17 W., Marshall County, Hydrologic Unit 07080208, on left bank 20 ft downstream from bridge on U.S. Highway 30, 3.5 mi upstream from mouth, and 4.1 mi southeast of court house in Marshalltown.

DRAINAGE AREA.--118 mi².

PERIOD OF RECORD.--October 1949 to current year.

REVISED RECORDS.--WSP 1708: 1950-55, 1957-59.

GAGE.--Water-stage recorder. Datum of gage is 849.44 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 20-29, 31, Nov. 5, 14, 15, Nov. 19 to Mar. 6, and Mar. 8. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and data collection platform at station.

AVERAGE DISCHARGE.--41 years, 73.9 ft³/s, 8.50 in/yr, 53,540 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft³/s Aug. 16, 1977, gage height, 17.69 ft; no flow for a few days in 1956 and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of 16.8 ft, discharge, 5,700 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 8	1715	1,420	(a) 13.60	June 20	0100	*4,470	*15.42
Mar. 13	1500	1,060	9.88	June 22	1330	1,870	12.25
May 16	1230	1,890	12.45	July 20	0200	1,770	12.17
May 25	2000	1,550	11.60	July 27	0030	2,110	12.93
June 17	2130	4,230	15.04	July 29	0600	3,360	14.57

(a) backwater from ice

Minimum daily discharge, 0.21 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.7	10	2.4	.37	4.2	2.2	47	97	195	178	313	80
2	1.7	8.2	1.4	.43	3.5	2.5	45	85	177	163	279	74
3	1.4	6.8	1.3	.41	3.9	2.0	41	76	163	149	345	75
4	2.1	6.1	1.5	.39	4.6	2.2	41	78	145	132	326	67
5	2.9	5.6	1.7	.42	5.2	1.6	40	72	136	130	242	61
6	5.3	4.7	1.4	.41	4.8	.90	37	65	129	127	215	58
7	4.1	4.1	1.0	.46	5.8	.92	35	60	117	113	199	53
8	3.1	3.7	1.1	.49	5.4	800	34	56	145	106	184	61
9	2.4	3.2	1.3	.47	5.2	297	33	92	136	97	169	53
10	2.0	3.0	.80	.54	5.0	71	36	101	115	100	284	49
11	1.8	3.3	.45	.50	6.0	141	35	84	113	134	184	45
12	1.3	3.3	.41	.49	7.4	86	31	93	115	144	163	42
13	2.0	3.4	.37	.54	5.0	487	31	97	146	181	149	39
14	2.2	3.4	.32	.66	3.5	440	38	92	139	157	141	38
15	1.9	3.3	.27	.90	3.6	455	35	101	146	131	130	36
16	4.9	2.8	.29	2.0	3.5	233	33	1170	355	114	121	34
17	6.7	3.3	.27	1.7	3.3	178	30	368	2640	93	118	33
18	4.1	2.6	.27	1.5	3.4	143	25	251	1350	76	111	38
19	4.0	3.1	.26	1.3	2.5	119	27	451	1550	436	102	43
20	3.7	3.2	.25	1.3	2.7	113	40	284	1600	805	149	38
21	3.2	3.0	.24	1.2	2.8	106	38	218	470	243	113	36
22	3.0	2.7	.22	1.5	2.7	97	35	188	1320	187	102	35
23	2.8	2.7	.21	1.9	2.9	84	34	200	807	157	99	32
24	3.0	2.8	.28	1.8	2.4	77	32	469	437	140	150	32
25	2.8	2.7	.33	1.6	1.9	71	29	1280	341	131	441	31
26	2.7	2.7	.30	2.7	2.2	64	28	670	290	634	171	28
27	2.6	2.8	.34	2.6	2.0	58	45	423	259	1040	130	27
28	3.5	2.0	.38	3.5	2.1	54	186	325	229	845	112	26
29	7.2	2.2	.36	4.3	---	54	152	275	216	2120	101	25
30	13	2.3	.34	4.0	---	53	118	236	195	516	99	29
31	12	---	.38	4.4	---	50	---	208	---	380	89	---
TOTAL	116.1	113.0	20.44	44.78	107.5	4343.32	1411	8265	14176	9959	5531	1318
MEAN	3.75	3.77	.66	1.44	3.84	140	47.0	267	473	321	178	43.9
MAX	13	10	2.4	4.4	7.4	800	186	1280	2640	2120	441	80
MIN	1.3	2.0	.21	.37	1.9	.90	25	56	113	76	89	25
AC-FT	230	224	41	89	213	8610	2800	16390	28120	19750	10970	2610
CFSM	.03	.03	.01	.01	.03	1.19	.40	2.26	4.00	2.72	1.51	.37
IN.	.04	.04	.01	.01	.03	1.37	.44	2.61	4.47	3.14	1.74	.42

CAL YR 1989	TOTAL	4194.34	MEAN	11.5	MAX	756	MIN	.21	AC-FT	8320	CFSM	.10	IN.	1.32
WTR YR 1990	TOTAL	45405.14	MEAN	124	MAX	2640	MIN	.21	AC-FT	90060	CFSM	1.05	IN.	14.31

IOWA RIVER BASIN

05451900 RICHLAND CREEK NEAR HAVEN, IA

LOCATION.--Lat 41°53'58", long 92°28'27", in SE1/4 NE1/4 sec.21, T.82 N., R.14 W., Tama County, Hydrologic Unit 07080208, on right bank 5 ft upstream from bridge on county highway, 0.6 mi northeast of Haven, and 2.8 mi upstream from mouth.

DRAINAGE AREA.--56.1 mi².

PERIOD OF RECORD.--October 1949 to current year.

REVISED RECORDS.--WSP 1708: 1950-55, 1956 (M), 1957, 1958 (M), 1959.

GAGE.--Water-stage recorder. Datum of gage is 788.69 ft above NGVD. Prior to Oct. 1, 1971, at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 21 to Mar. 9. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corp of Engineers data collection platform at station.

AVERAGE DISCHARGE.--41 years, 35.8 ft³/s, 8.67 in/yr, 25,940 acre-ft/yr; median of yearly mean discharges, 31 ft³/s, 7.5 in/yr, 22,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,000 ft³/s May 28, 1974, gage height, 24.00 ft; no flow Jan. 22 to Feb. 2, 1977, and July 9, 10, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1918 reached a stage of 24.3 ft, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 25	1045	1,380	18.84	June 19	2330	*2,740	*21.54
June 17	1315	2,690	21.50	June 22	0930	1,680	20.15

Minimum daily discharge, 0.48 ft³/s, Dec. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.96	2.2	1.2	.75	2.6	3.8	21	24	69	92	72	18
2	.66	1.7	1.1	.99	2.6	4.4	19	21	66	84	64	18
3	.86	1.7	1.0	.97	2.5	4.7	18	20	55	76	173	18
4	.88	1.7	1.2	1.2	2.7	4.8	18	24	48	67	116	17
5	1.8	1.6	1.6	1.6	3.1	4.7	16	22	48	77	71	15
6	1.5	1.4	1.5	1.4	3.4	3.3	15	20	44	64	59	15
7	1.2	1.3	1.4	1.3	3.9	2.8	14	19	41	58	53	17
8	1.2	1.2	1.3	1.2	4.5	42	14	17	285	52	48	43
9	.93	1.2	1.5	1.3	4.7	47	14	21	91	48	43	14
10	.90	1.1	1.5	1.3	4.5	35	15	21	64	55	45	13
11	.95	1.1	1.1	1.4	4.2	112	13	18	53	67	43	12
12	.89	1.0	.85	1.4	4.8	56	12	25	48	50	39	12
13	.86	1.3	.78	1.3	5.6	145	14	26	42	47	36	11
14	.86	1.1	.65	1.2	4.8	216	16	26	56	43	34	11
15	1.1	1.1	.57	1.3	3.6	213	13	29	42	41	31	10
16	1.3	.93	.57	3.7	3.4	123	13	216	1260	36	29	10
17	1.5	.86	.56	6.5	2.7	91	12	99	1680	32	30	9.8
18	1.3	.64	.58	7.4	2.2	70	11	75	233	30	27	11
19	1.2	.83	.54	5.8	2.6	54	12	115	949	63	25	12
20	1.1	1.1	.52	4.4	2.7	49	15	76	575	100	35	11
21	1.1	1.5	.49	3.7	3.2	45	13	61	199	65	26	11
22	1.1	1.1	.48	4.2	3.8	38	12	54	848	47	25	9.7
23	.93	1.0	.48	5.0	3.3	30	12	82	336	39	24	9.1
24	.98	1.0	.50	5.7	2.9	29	11	343	192	34	25	9.0
25	.91	.96	.61	4.5	2.6	27	10	669	161	31	99	8.8
26	.94	1.0	.58	3.6	2.4	25	9.8	225	142	77	37	8.3
27	.89	1.1	.64	3.8	2.7	23	13	153	129	171	27	7.9
28	1.1	.98	.82	3.3	3.0	23	34	120	119	263	24	7.3
29	1.4	.96	.76	3.0	--	24	35	101	110	292	22	7.0
30	4.1	1.1	.74	2.9	--	22	28	86	101	110	21	7.5
31	3.3	--	.76	2.6	--	21	--	75	--	85	20	--
TOTAL	38.70	35.76	26.88	88.71	95.0	1588.5	472.8	2883	8086	2396	1423	383.4
MEAN	1.25	1.19	.87	2.86	3.39	51.2	15.8	93.0	270	77.3	45.9	12.8
MAX	4.1	2.2	1.6	7.4	5.6	216	35	669	1680	292	173	43
MIN	.66	.64	.48	.75	2.2	2.8	9.8	17	41	30	20	7.0
AC-FT	77	71	.53	176	188	3150	938	5720	16040	4750	2820	760
CFSM	.02	.02	.02	.05	.06	.91	.28	1.66	4.80	1.38	.82	.23
IN.	.03	.02	.02	.06	.06	1.05	.31	1.91	5.36	1.59	.94	.25

CAL YR 1989	TOTAL 2068.72	MEAN 5.67	MAX 351	MIN .00	AC-FT 4100	CFSM .10	IN. 1.37
WTR YR 1990	TOTAL 17517.75	MEAN 48.0	MAX 1680	MIN .48	AC-FT 34750	CFSM .86	IN. 11.62

IOWA RIVER BASIN

87

05452000 SALT CREEK NEAR ELBERON, IA

LOCATION.--Lat $41^{\circ}57'51''$, long $92^{\circ}18'47''$, in NW1/4 NW1/4 sec.36, T.83 N., R.13 W., Tama County, Hydrologic Unit 07080208, at left downstream end of bridge on U.S. Highway 30, 2.0 mi upstream from Hog Run, 3.0 mi south of Elberon, and 9.0 mi upstream from mouth.

DRAINAGE AREA.--201 mi².

PERIOD OF RECORD.--October 1945 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1946.

GAGE.--Water-stage recorder. Datum of gage is 781.58 ft above NGVD (Iowa Highway Commission bench mark). Prior to Oct. 15, 1945 and June 14, 1947 to Feb. 10, 1949, nonrecording gage on upstream side of bridge at present datum.

REMARKS.--Estimated daily discharges: Nov. 23 to Mar. 9, Apr. 15 and May 20, 21. Records good except those for estimated daily discharge, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and data collection platform at station.

AVERAGE DISCHARGE.--45 years, 131 ft³/s, 8.85 in/yr, 94,910 acre-ft/yr; median of yearly mean discharges, 120 ft³/s, 8.1 in/yr, 86,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 35,000 ft³/s June 13, 1947, gage height, 17.6 ft from rating curve extended above 17,000 ft³/s; maximum gage height, 20.00 ft June 15, 1982; minimum daily discharge, 0.85 ft³/s Jan. 31, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 16, 1944 reached a stage of 19.9 ft, from floodmark at downstream side of bridge, discharge, about 30,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 25	1700	1,670	14.64	June 29	1245	2,070	15.23
June 17	1515	*8,730	*17.66	July 29	1745	1,920	15.02
June 23	0330	3,330	16.17	Aug. 25	2315	1,560	14.37

Minimum daily discharge, 1.6 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.1	18	4.6	2.4	9.2	11	38	40	185	314	282	144
2	7.3	12	4.5	2.7	9.0	12	37	38	175	272	241	130
3	6.0	10	3.5	3.0	8.8	17	29	35	164	241	453	132
4	5.7	9.7	3.9	3.2	9.0	15	33	40	140	208	848	127
5	9.6	9.5	4.7	3.3	10	13	27	41	156	241	296	111
6	12	8.4	4.5	3.2	12	9.4	22	37	235	204	230	104
7	8.3	8.0	3.8	3.3	14	15	20	34	150	188	201	94
8	7.1	8.3	4.2	3.4	15	100	23	32	167	175	179	135
9	5.8	8.0	4.3	3.6	16	150	23	34	147	320	163	107
10	6.0	7.4	4.3	3.7	16	93	30	62	131	213	212	94
11	4.7	7.0	3.5	4.0	15	596	22	49	123	285	301	86
12	3.9	6.5	2.9	3.9	17	286	25	56	119	620	158	81
13	3.9	7.1	2.6	3.7	15	686	31	60	113	324	137	78
14	4.2	7.5	2.7	3.9	11	1190	40	55	106	236	126	75
15	5.3	6.8	2.6	4.2	10	1340	35	56	165	193	115	69
16	6.2	6.3	2.2	11	9.5	819	33	1050	925	172	106	67
17	6.7	4.4	2.1	22	9.0	387	30	684	4330	152	148	62
18	4.8	3.9	2.0	26	9.0	233	28	264	1810	138	118	66
19	4.4	5.5	1.9	21	10	154	29	1010	633	188	99	75
20	5.2	7.0	1.8	16	9.8	151	35	680	632	525	162	65
21	4.9	6.4	1.7	13	9.2	134	39	300	420	424	161	65
22	5.0	6.1	1.6	13	10	110	36	245	1660	244	125	59
23	4.6	4.5	1.7	16	14	69	35	230	2120	191	113	56
24	4.9	4.7	1.7	19	14	75	33	645	559	167	139	55
25	4.7	5.0	1.8	18	11	71	29	1350	427	148	1130	56
26	10	5.4	2.1	15	8.4	58	27	600	366	178	639	53
27	13	5.6	2.2	13	9.6	48	30	372	333	778	279	49
28	10	4.8	2.4	10	8.5	47	43	301	639	1250	223	47
29	11	4.2	2.5	9.5	---	47	55	252	1520	1820	196	44
30	26	4.4	2.4	9.0	---	43	48	215	402	585	220	46
31	27	---	2.3	8.8	---	38	---	196	---	346	164	---
TOTAL	245.3	212.4	89.0	291.8	319.0	7017.4	965	9063	19052	11340	7964	2432
MEAN	7.91	7.08	2.87	9.41	11.4	226	32.2	292	635	366	257	81.1
MAX	27	18	4.7	26	17	1340	55	1350	4330	1820	1130	144
MIN	3.9	3.9	1.6	2.4	8.4	9.4	20	32	106	138	99	44
AC-FT	487	421	177	579	633	13920	1910	17980	37790	22490	15800	4820
CFSM	.04	.04	.01	.05	.06	1.13	.16	1.45	3.16	1.82	1.28	.40
IN.	.05	.04	.02	.05	.06	1.30	.18	1.68	3.53	2.10	1.47	.45

CAL YR 1989	TOTAL	8460.3	MEAN	23.2	MAX	1290	MIN	1.6	AC-FT	16780	CFSM	.12	IN.	1.57
WTR YR 1990	TOTAL	58990.9	MEAN	162	MAX	4330	MIN	1.6	AC-FT	117000	CFSM	.80	IN.	10.92

IOWA RIVER BASIN

05452200 WALNUT CREEK NEAR HARTWICK, IA

LOCATION.--Lat 41°50'06", long 92°23'10", in SE1/4 SW1/4 sec.8, T.81 N, R.13 W., Poweshiek County, Hydrologic Unit 07080208, on right bank 5 ft downstream from bridge on county highway V21, 1.2 mi downstream from North Walnut Creek, 4.0 mi northwest of Hartwick, and 6.5 mi upstream from mouth.

DRAINAGE AREA.--70.9 mi².

PERIOD OF RECORD.--October 1949 to current year.

REVISED RECORDS.--WSP 1558: 1950 (P), 1951-57.

GAGE.--Water-stage recorder. Datum of gage is 786.59 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 1-3, 6-8, Dec. 1 to Mar. 9, and June 17-19. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--41 years, 44.8 ft³/s, 8.58 in/yr, 32,460 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,100 ft³/s July 2, 1983, gage height, 16.65 ft, from rating curve extended above 2,600 ft³/s on basis of contracted-opening and flow-over-embankment measurement of peak flow; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of 17.7 ft, from information by local residents, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 25	0815	1,560	13.10	June 19	1530	4,820	15.18
June 16	1730	6,450	15.71	June 22	0645	1,360	11.30
June 17	0645	*6,850	*15.79	July 28	2345	6,500	15.72

Minimum daily discharge, 0.31 ft³/s Dec. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.0	12	1.1	.51	6.7	5.1	23	27	84	110	121	29
2	2.5	9.1	1.0	.62	6.3	6.7	19	24	75	98	109	27
3	2.2	7.8	.96	.58	6.0	6.6	16	22	60	87	191	30
4	2.4	6.6	.99	1.4	6.4	5.6	17	35	51	75	205	26
5	8.8	6.3	.99	2.3	7.0	3.8	12	33	52	82	108	23
6	7.2	5.0	.96	2.0	8.1	1.8	10	31	46	68	82	22
7	3.2	4.1	.92	1.8	10	2.4	8.8	29	44	63	70	23
8	2.4	2.9	.83	1.7	11	35	9.3	26	388	56	61	40
9	2.5	2.3	1.4	1.9	11	77	8.2	31	131	50	53	23
10	2.1	2.2	1.4	1.9	10	83	11	24	93	53	49	20
11	2.4	2.7	1.0	2.1	9.0	245	6.3	21	75	62	45	17
12	2.0	2.6	.82	2.1	9.7	126	5.8	38	64	62	64	16
13	2.1	2.8	.64	1.7	11	219	9.7	44	54	46	43	15
14	2.3	2.5	.46	1.5	10	280	14	40	74	42	39	14
15	2.5	2.7	.36	1.7	8.7	259	9.1	39	50	39	35	13
16	3.9	1.7	.40	2.9	8.2	177	7.5	119	2070	35	33	12
17	4.7	1.6	.40	6.8	6.6	135	5.6	82	3500	29	34	12
18	3.2	1.6	.36	28	5.4	108	4.2	67	1000	29	30	15
19	2.4	1.8	.35	19	5.4	83	6.4	150	2200	118	64	15
20	2.6	3.0	.35	13	5.5	73	13	106	553	115	210	13
21	2.4	4.4	.32	9.7	6.3	68	8.5	83	320	63	70	12
22	2.3	2.9	.31	10	7.2	59	8.3	72	870	46	55	11
23	2.2	3.0	.31	11	5.8	43	9.0	106	398	35	47	11
24	3.0	2.1	.32	14	4.8	40	7.1	277	262	30	134	11
25	2.2	2.2	.35	12	4.2	36	5.1	700	215	27	172	10
26	1.6	3.4	.35	9.6	3.8	31	5.0	280	188	33	86	9.0
27	1.6	2.4	.38	9.9	4.0	28	13	208	167	52	65	8.8
28	1.7	1.6	.46	8.8	4.3	27	43	165	153	971	53	8.9
29	2.8	1.2	.50	7.9	---	31	42	134	140	1030	44	8.6
30	18	1.1	.52	7.3	---	27	32	111	124	211	39	10
31	17	--	.57	6.8	---	25	---	94	---	153	32	--
TOTAL	119.2	105.6	20.08	200.51	202.4	2347.0	388.9	3218	13501	3970	2443	505.3
MEAN	3.85	3.52	.65	6.47	7.23	75.7	13.0	104	450	128	78.8	16.8
MAX	18	12	1.4	28	11	280	43	700	3500	1030	210	40
MIN	1.6	1.1	.31	.51	3.8	1.8	4.2	21	44	27	30	8.6
AC-FT	236	209	40	398	401	4660	771	6380	26780	7870	4850	1000
CFSM	.05	.05	.01	.09	.10	1.07	.18	1.46	6.35	1.81	1.11	.24
IN.	.06	.06	.01	.11	.11	1.23	.20	1.69	7.08	2.08	1.28	.27

CAL YR 1989 TOTAL 3131.53 MEAN 8.58 MAX 306 MIN .31 AC-FT 6210 CFSM .12 IN. 1.64
WTR YR 1990 TOTAL 27020.99 MEAN 74.0 MAX 3500 MIN .31 AC-FT 53600 CFSM 1.04 IN. 14.18

05453000 BIG BEAR CREEK AT LADORA, IA

LOCATION.--Lat 41°44'58", long 92°10'55", in SW1/4 SW1/4 sec.7, T.80 N., R.11 W., Iowa County, Hydrologic Unit 07080208, on left bank 10 ft downstream from bridge on county highway V52, 0.4 mi south of Ladora, 1.2 mi downstream from Coats Creek, 2.8 mi upstream from Little Bear Creek, and 8.1 mi upstream from mouth.

DRAINAGE AREA.--189 mi².

PERIOD OF RECORD.--October 1945 to current year. Prior to October 1966, published as Bear Creek at Ladora.

REVISED RECORDS.--WSP 1308: 1947 (M). WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 744.94 ft above NGVD. Oct. 1945 to June 26, 1946, non-recording gage and June 27, 1946 to Sept. 30, 1980, water-stage recorder at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 17-19, 23, 24, Nov. 28 to Mar. 9, and Mar. 11, 12. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--45 years, 122 ft³/s, 8.77 in/yr, 88,390 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,500 ft³/s Mar. 30, 1960, gage height, 14.60 ft, datum then in use; maximum gage height, 15.32 ft, datum then in use, Sept. 18, 1977; no flow for several days in 1956 and 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 17	2015	*5,640	*23.65	June 22	1515	2,060	18.03
June 20	0530	5,340	23.35	July 29	0415	3,570	21.06

Minimum daily discharge, 0.76 ft³/s Dec. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.9	13	5.5	1.0	9.6	11	72	67	195	300	245	78
2	6.7	9.7	5.1	1.2	9.2	16	64	59	178	274	235	75
3	6.3	8.4	4.8	1.3	9.0	16	56	56	158	251	221	81
4	6.3	8.2	4.9	1.4	10	13	58	100	132	222	756	72
5	6.2	7.2	4.9	1.8	11	12	52	149	136	218	268	65
6	6.3	7.0	4.7	1.7	14	11	45	118	141	205	203	62
7	6.5	6.5	4.3	1.5	18	10	43	105	118	180	172	59
8	6.4	6.5	3.8	1.6	19	81	43	95	882	165	154	62
9	6.4	6.6	5.8	1.8	21	149	42	93	384	149	135	64
10	6.6	6.4	5.5	1.9	19	140	44	92	242	145	123	52
11	5.5	6.0	3.7	2.2	17	400	38	76	165	159	113	48
12	5.7	6.1	2.8	2.2	19	274	35	98	144	280	140	44
13	4.7	5.5	2.1	1.9	22	335	39	121	148	169	117	42
14	4.6	5.6	1.4	1.6	21	686	57	106	177	145	92	39
15	6.9	5.6	1.1	1.9	17	888	44	103	182	132	81	37
16	7.3	6.0	1.2	3.4	16	473	39	133	1600	126	72	35
17	7.2	6.3	1.1	8.7	13	327	35	144	5230	106	76	34
18	7.4	6.0	.95	30	11	250	31	107	1690	93	65	39
19	6.3	6.2	.90	21	11	198	32	112	2350	113	221	42
20	6.1	6.6	.85	14	12	173	43	146	3120	245	1010	36
21	6.0	6.6	.80	11	14	164	41	106	911	154	255	35
22	5.5	6.1	.76	12	17	145	35	96	1430	113	184	33
23	5.1	5.3	.76	15	13	112	35	112	1240	92	153	30
24	4.8	6.2	.84	18	10	101	33	177	734	81	131	29
25	4.2	7.2	.92	15	9.1	96	29	1180	590	73	349	29
26	4.4	6.6	1.0	12	8.1	89	27	692	501	67	176	27
27	4.4	6.4	1.1	13	8.6	80	34	476	442	125	134	26
28	4.3	5.9	1.2	12	9.3	79	68	362	412	794	115	25
29	4.7	6.0	1.2	11	---	86	101	285	378	1860	101	24
30	14	5.9	1.1	10	---	82	82	251	332	458	93	25
31	22	---	1.1	9.6	---	75	---	217	---	310	85	---
TOTAL	205.7	201.6	76.18	240.7	387.9	5572	1397	6034	24342	7804	6275	1349
MEAN	6.64	6.72	2.46	7.76	13.9	180	46.6	195	811	252	202	45.0
MAX	22	13	5.8	30	22	888	101	1180	5230	1860	1010	81
MIN	4.2	5.3	.76	1.0	8.1	10	27	56	118	67	65	24
AC-FT	408	400	151	477	769	11050	2770	11970	48280	15480	12450	2680
CFSM	.04	.04	.01	.04	.07	.95	.25	1.03	4.29	1.33	1.07	.24
IN.	.04	.04	.01	.05	.08	1.10	.27	1.19	4.79	1.54	1.24	.27

CAL YR 1989	TOTAL	7136.68	MEAN	19.6	MAX	700	MIN	.76	AC-FT	14160	CFSM	.10	IN.	1.40
WTR YR 1990	TOTAL	53885.08	MEAN	148	MAX	5230	MIN	.76	AC-FT	106900	CFSM	.78	IN.	10.61

IOWA RIVER BASIN

05453100 IOWA RIVER AT MARENGO, IA

LOCATION.-- Lat $41^{\circ}48'48''$ long $92^{\circ}03'51''$, in SE1/4 NE1/4 sec.24, T.81 N., R.11 W., Iowa County, Hydrologic Unit 07080208, on left bank 5 ft upstream from bridge on State Highway 411, 1.0 mi downstream from Big Bear Creek, 0.8 mi north of Marengo, 4.6 mi upstream from Hilton Creek, and at mile 139.1.

DRAINAGE AREA.--2,794 mi².

PERIOD OF RECORD.--October 1956 to current year. Monthly discharge only for some periods, published in WSP 1728.

REVISED RECORDS.--WSP 1558: 1957.

GAGE.--Water-stage recorder. Datum of gage is 720.52 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 17, 18, 23-29 and Dec. 1 to Mar. 10. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--34 years, 1,786 ft³/s, 8.68 in/yr, 1,294,000 acre-ft/yr.EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,800 ft³/s Mar. 31, 1960, gage height, 19.21 ft; maximum gage height, 19.79 ft July 12, 1969; minimum daily discharge, 24 ft³/s Jan. 29 to Feb. 1, 1977.EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 27	1315	8,700	16.07	July 29	1100	8,610	16.04
Jun. 21	0630	*18,100	*18.68	Aug. 1	1800	12,500	17.42

Minimum daily discharge, 45 ft³/s Dec. 24, 25.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	113	152	94	70	400	140	882	1340	3500	7350	12100	2990
2	107	145	90	64	380	135	840	1300	3030	5230	11800	2850
3	103	144	80	62	360	130	794	1190	2740	4130	10600	2740
4	101	146	70	60	340	130	761	1170	2490	3750	10800	2570
5	102	150	62	58	320	135	722	1230	2330	3550	9630	2310
6	110	149	56	56	350	145	681	1140	2320	3340	8080	2060
7	115	144	53	54	400	150	652	1070	2330	3160	6860	1830
8	113	136	50	56	370	400	633	995	3480	2820	5460	1710
9	110	135	110	58	340	1500	613	943	3010	2610	4030	1700
10	110	138	100	60	310	2700	606	926	2500	2590	3370	1730
11	108	138	94	62	290	3370	584	1670	2260	2560	3270	1620
12	107	135	92	64	280	2690	564	2240	2100	3280	3640	1450
13	99	134	70	60	270	2300	560	2130	1980	3070	3350	1360
14	97	131	56	58	270	3480	596	1990	1920	3560	2820	1290
15	95	129	47	64	290	4690	606	1840	2000	4010	2500	1210
16	95	124	48	90	320	4440	607	2120	2740	3740	2280	1130
17	100	123	48	150	280	3810	597	4090	11800	3120	2180	1050
18	101	122	49	1000	250	3240	574	3990	12700	2710	2070	1010
19	100	132	50	760	220	2760	559	3050	13100	2470	1950	988
20	101	140	50	620	200	2330	580	3750	15900	3070	3580	992
21	105	134	48	520	185	2010	601	4240	17100	4050	2650	1020
22	112	128	47	470	180	1790	623	4400	16100	4410	2720	1020
23	115	120	46	450	170	1580	611	4580	16700	4410	2540	966
24	117	110	45	490	165	1400	591	4840	15900	3760	2310	923
25	114	130	45	560	160	1290	567	6050	13700	3370	2810	879
26	113	120	46	520	155	1200	547	7190	12400	3170	3780	829
27	110	110	47	500	150	1110	538	8500	11500	3480	4140	785
28	108	105	50	480	145	1050	600	8100	10500	4630	4230	750
29	109	102	60	460	--	1010	773	7560	9860	7610	3910	709
30	124	98	70	440	--	971	1110	6970	8820	7750	3290	680
31	154	--	80	420	--	923	--	4960	--	9690	3000	--
TOTAL	3368	3904	1953	8836	7550	53009	19572	105564	226810	126450	145750	43151
MEAN	109	130	63.0	285	270	1710	652	3405	7560	4079	4702	1438
MAX	154	152	110	1000	400	4690	1110	8500	17100	9690	12100	2990
MIN	95	98	45	54	145	130	538	926	1920	2470	1950	680
AC-FT	6680	7740	3870	17530	14980	105100	38820	209400	449900	250800	289100	85590
CFSM	.04	.05	.02	.10	.10	.61	.23	1.22	2.71	1.46	1.68	.51
IN.	.04	.05	.03	.12	.10	.71	.26	1.41	3.02	1.68	1.94	.57

CAL YR 1989 TOTAL 103305 MEAN 283 MAX 2790 MIN 45 AC-FT 204900 CFSM .10 IN. 1.38
WTR YR 1990 TOTAL 745917 MEAN 2044 MAX 17100 MIN 45 AC-FT 1480000 CFSM .73 IN. 9.93

05453510 CORALVILLE LAKE NEAR CORALVILLE, IA

LOCATION.--Lat 41°43'29", long 91°31'40", in SW1/4 NE1/4 sec.22, T.80 N., R.6 W., Johnson County, Hydrologic Unit 07080208, at outlet works at left end of Coralville Dam on Iowa River, 2.3 mi upstream from Rapid Creek, 4.3 mi northeast of Coralville Post Office and at mile 83.3.

DRAINAGE AREA.--3,115 mi².

PERIOD OF RECORD.--October 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is at NGVD (levels by U.S. Army Corps of Engineers).

REMARKS.--Reservoir is formed by earthfill dam completed in 1957. Storage began in September 1958. Releases controlled by three gates, 8.33 ft wide and 20 ft high, into forechamber of 23-ft diameter concrete conduit through dam. Inlet invert elevation at 646.0 ft. No dead storage. Maximum design discharge through gates is 20,000 ft³/s. Ungated spillway is concrete overflow section 500 ft in length at elevation 712 ft above NGVD, contents, 469,000 acre-ft, surface area, 24,800 acres. Reservoir is used for flood control, low-flow augmentation, conservation and recreation. Normal operation will maintain an elevation of 670 ft Feb. 15 to June 15, surface area, 1,820 acres; 680 ft June 15 to Sept. 25, surface area, 4,900 acres; 683 ft Sep. 25 to Dec. 15, and 680 ft December 15 to Feb. 1, with a minimum release of 150 ft³/s and maximum release of 10,000 ft³/s Dec. 15 to May 1 and 6,000 ft³/s May 1 to Dec. 15. Storage tables for water years 1985-1986 published as day second-feet instead of acre-feet storage.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 472,000 acre-ft July 21, 1969, elevation, 711.85 ft; minimum daily contents, 456 acre-ft Jan. 15, 1975; minimum elevation, 658.77 ft Mar. 10, 1959.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 378,000 acre-ft July 1; maximum elevation, 708.56 ft July 1; minimum daily contents, 38,100 acre-ft Jan. 15; minimum elevation, 682.13 ft Jan. 16.

Capacity table (elevation, in feet, and contents, in acre-ft)

655	5,000	683	55,000	700	232,000
670	10,600	685	69,000	705	327,000
675	21,000	690	108,000	710	427,000
680	40,300	695	162,000	712	469,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44200	43400	43300	39400	44000	43300	43200	43900	109000	378000	202000	187000
2	43900	43300	43200	39200	44000	43500	42100	43900	108000	375000	226000	180000
3	43700	43300	42700	39000	44300	43700	42100	44200	103000	370000	252000	172000
4	43500	43200	42700	39300	44300	43900	42600	45900	98200	361000	272000	164000
5	44000	43500	42900	39000	44300	44000	43000	46400	92800	353000	288000	154000
6	44000	43400	42900	38900	44600	44100	43300	45900	88200	342000	297000	144000
7	43900	43400	42600	38800	44800	44200	43300	45200	86200	332000	299000	135000
8	43700	43600	42400	38600	45300	44600	43600	44600	90700	321000	297000	125000
9	43700	44200	42400	38600	45900	45200	44300	45900	92000	307000	293000	115000
10	43700	43500	42400	38500	46500	48700	44600	45000	91000	298000	286000	104000
11	43800	43500	42400	38500	47100	52600	44400	44300	86600	287000	279000	93500
12	43500	43400	42400	38400	46900	53100	44200	45900	81900	277000	272000	85300
13	43600	43600	41900	38200	46600	51600	44600	46000	76600	267000	265000	78300
14	43400	43900	41800	38200	46100	49100	44200	45800	71300	258000	256000	71300
15	43500	44700	41600	38100	45000	48400	43700	45000	65200	249000	246000	64900
16	43500	43700	41500	38200	44300	48800	44000	44500	81300	241000	235000	58500
17	43600	43900	41400	38400	43400	48800	43600	41900	81300	233000	226000	53300
18	43400	43300	41300	38800	43000	48000	43500	42700	155000	223000	215000	50700
19	43300	43300	41200	40000	42700	46600	43800	45300	186000	214000	211000	48500
20	43100	43500	41100	40800	42600	45500	44300	42700	213000	207000	218000	46600
21	42900	43300	40900	41300	42700	45100	44500	41700	247000	203000	223000	45900
22	42800	43600	40700	41600	43000	45200	44600	42300	279000	200000	225000	45700
23	42800	43500	40600	41800	43400	43300	44900	42900	301000	196000	217000	45600
24	42900	43500	40400	42100	43400	43200	45200	43700	324000	191000	208000	45500
25	42700	43600	40300	42200	43300	43600	45400	52400	342000	184000	219000	45600
26	42700	43200	40000	42700	43400	43600	45600	65400	353000	178000	219000	45400
27	42800	44600	39900	43100	43400	43300	45600	76100	364000	172000	217000	45200
28	42700	43700	39700	43400	43400	43100	45200	84500	367000	170000	212000	44800
29	42800	43300	39700	43400	---	42900	44900	90600	372000	175000	208000	44800
30	43300	43300	39500	43600	---	42800	44500	98000	375000	181000	202000	44700
31	43200	---	39400	43800	---	42700	---	104000	---	189000	195000	---
MEAN	43400	43600	41500	40200	44300	45700	44100	52800	179000	256000	241000	86100
MAX	44200	44700	43300	43800	47100	53100	45600	104000	375000	378000	299000	187000
MIN	42700	43200	39400	38100	42600	42700	42100	41700	65200	170000	195000	44700

CAL YR 1989 MEAN 37400 MAX 48600 MIN 22600
WTR YR 1990 MEAN 93600 MAX 378000 MIN 38100

IOWA RIVER BASIN

05454000 RAPID CREEK NEAR IOWA CITY, IA

LOCATION.--Lat 41°41'19", long 91°29'15", in NE1/4 NE1/4 sec.36. T.80 N., R.6 W., Johnson County, Hydrologic Unit 07080209, on left bank 80 ft upstream from bridge on State Highway 1, 3.5 mi northeast of Iowa City, and 4.7 mi upstream from mouth.

DRAINAGE AREA.--25.3 mi².

PERIOD OF RECORD.--October 1937 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1558: 1941 (M), 1943 (P), 1944 (M), 1946. WSP 1708: 1951 (P), 1952. WDR IOWA 1967: Drainage area.

GAGE.--Water-stage recorder and concrete control with sharp-crested weir. Datum of gage is 673.72 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 23 to Mar. 8. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--53 years, 16.1 ft³/s, 8.64 in/yr, 11,660 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,100 ft³/s May 23, 1965, gage height, 14.10 ft, from contracted-opening measurement of peak flow; maximum gage height, 14.93 ft July 17, 1972; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 16	1745	3,130	13.27				
June 17	0525	2,540	12.59	Aug. 20	0140	*3,480	*13.61

No flow for part of Oct. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.05	.48	.06	.03	.65	1.7	5.7	2.3	28	25	13	21
2	.02	.35	.05	.04	.70	2.1	5.2	2.2	26	22	11	18
3	.01	.27	.03	.04	.67	2.5	4.6	2.4	21	20	11	18
4	.01	.23	.04	.04	.80	2.0	4.8	42	18	17	10	16
5	.04	.26	.06	.05	.95	1.7	4.4	59	22	17	8.6	14
6	.08	.25	.08	.06	1.2	1.4	3.8	46	19	15	7.7	13
7	.07	.26	.09	.08	1.4	1.1	3.5	32	16	14	7.4	12
8	.05	.26	.08	.12	1.7	15	3.8	24	46	12	7.1	11
9	.09	.26	.07	.18	1.6	17	3.9	21	24	11	6.6	10
10	.10	.25	.08	.22	1.5	19	4.4	17	18	12	6.4	9.8
11	.06	.25	.07	.26	1.7	56	3.5	13	15	16	6.1	9.0
12	.04	.23	.06	.23	1.9	37	3.2	33	14	11	38	8.7
13	.03	.23	.05	.21	2.0	65	3.9	47	15	10	9.8	7.3
14	.06	.23	.04	.18	1.1	59	4.9	33	154	9.4	7.7	6.9
15	.04	.21	.03	.20	.80	86	4.1	27	34	8.7	6.7	6.5
16	.03	.19	.04	.27	.80	48	3.7	56	1700	8.5	6.2	6.3
17	.04	.16	.04	.40	.75	33	3.5	35	978	7.1	43	5.6
18	.04	.09	.03	1.2	.60	24	3.0	26	102	6.9	15	5.8
19	.04	.12	.03	.80	.52	19	3.2	25	109	8.1	343	6.8
20	.04	.24	.03	.75	.62	16	4.0	20	80	8.0	1050	5.5
21	.04	.16	.03	.85	.68	14	3.8	17	59	53	100	7.8
22	.04	.09	.02	.90	1.5	13	3.3	15	151	17	65	5.3
23	.05	.08	.02	1.6	2.5	9.1	3.4	16	83	12	50	4.2
24	.05	.07	.03	1.8	2.2	8.6	3.2	36	57	9.8	40	3.8
25	.06	.07	.03	1.0	1.7	8.2	2.9	186	44	9.2	203	3.8
26	.07	.08	.03	.80	1.4	7.3	2.8	81	37	9.0	64	3.6
27	.07	.08	.04	.90	1.3	6.6	3.0	58	33	13	43	3.2
28	.09	.07	.05	1.2	1.5	6.4	3.5	124	53	16	34	3.2
29	.10	.06	.04	.90	--	6.5	3.1	61	40	121	30	2.9
30	.26	.05	.04	.55	--	6.2	2.7	43	30	26	28	2.9
31	.51	--	.03	.60	--	5.8	--	34	--	17	24	--
TOTAL	2.28	5.63	1.42	16.46	34.74	598.2	112.8	1233.9	4026	561.7	2295.3	251.9
MEAN	.074	.19	.046	.53	1.24	19.3	3.76	39.8	134	18.1	74.0	8.40
MAX	.51	.48	.09	1.8	2.5	86	5.7	186	1700	121	1050	21
MIN	.01	.05	.02	.03	.52	1.1	2.7	2.2	14	6.9	6.1	2.9
AC-FT	4.5	11	2.8	33	69	1190	224	2450	7990	1110	4550	500
CFSM	.00	.01	.00	.02	.05	.76	.15	1.57	5.30	.72	2.93	.33
IN.	.00	.01	.00	.02	.05	.88	.17	1.81	5.92	.83	3.37	.37

CAL YR 1989 TOTAL 588.16 MEAN 1.61 MAX 71 MIN .00 AC-FT 1170 CFSM .06 IN. .86
WTR YR 1990 TOTAL 9140.33 MEAN 25.0 MAX 1700 MIN .01 AC-FT 18130 CFSM .99 IN. 13.44

IOWA RIVER BASIN

93

05454300 CLEAR CREEK NEAR CORALVILLE, IA

LOCATION.--Lat 41°40'36", long 91°35'55", in NE1/4 SE1/4 sec.1, T.79 N., R.7 W., Johnson County, Hydrologic Unit 07080209, on left bank about 100 ft upstream from bridge on county highway, 1.1 mi west of post office in Coralville, 1.5 mi downstream from Deer Creek and 2.7 mi upstream from mouth.

DRAINAGE AREA.--98.1 mi².

PERIOD OF RECORD.--October 1952 to current year. Monthly discharge only for some periods, published in WSP 1728.

GAGE.--Water-stage recorder. Datum of gage is 647.48 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to Jan. 7, 1957, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 22 to Mar. 6, June 9, and Aug. 27. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--38 years, 66.6 ft³/s, 9.22 in/yr, 48,250 acre-ft/yr; median of yearly mean discharges, 56 ft³/s, 7.8 in/yr, 40,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,700 ft³/s June 17, 1990, gage height, 16.36 ft; no flow Jan. 18 to Feb. 4, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 9	0200	1,020	8.52	July 29	0100	1,040	8.61
June 17	0500	*11,700	*16.36	Aug. 20	2400	4,050	13.09
June 20	1100	1,270	9.71	Aug. 25	1400	2,060	11.64

Minimum daily discharge, 0.74 ft³/s Dec. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.5	7.3	2.9	.95	6.5	14	29	21	100	104	66	98
2	3.9	5.3	2.8	1.4	6.2	23	28	19	99	101	54	86
3	3.5	5.3	2.9	1.3	6.0	25	23	19	109	100	51	230
4	3.3	4.4	3.4	5.0	7.0	20	24	170	77	86	68	161
5	7.7	5.1	3.8	11	8.5	16	22	358	81	74	54	101
6	11	5.4	4.0	9.0	9.6	10	18	209	126	76	40	84
7	9.4	6.0	3.9	7.8	12	5.6	16	146	77	58	36	72
8	3.7	6.1	3.5	7.2	14	134	17	114	496	58	34	65
9	3.3	6.4	3.7	7.8	16	126	18	98	521	50	32	61
10	3.5	4.6	3.8	7.6	15	83	21	85	167	52	28	57
11	3.0	4.4	2.5	8.6	13	317	17	70	129	69	26	52
12	3.0	3.9	1.8	8.0	15	203	14	135	111	58	228	48
13	2.5	3.4	1.6	6.4	18	274	18	248	99	52	79	45
14	3.4	4.0	1.2	5.2	16	254	24	155	96	46	52	43
15	1.8	4.1	1.0	5.6	12	292	19	121	96	44	36	39
16	1.9	3.8	1.1	9.0	10	171	16	282	2070	42	31	38
17	2.2	4.1	1.1	20	8.2	117	14	144	7310	36	53	35
18	2.9	3.9	.92	25	6.6	88	11	107	1390	37	99	36
19	4.7	4.3	.85	18	7.4	72	12	144	614	42	196	39
20	3.7	3.2	.83	12	8.4	63	15	127	874	50	2230	35
21	2.7	4.2	.76	9.5	11	60	16	98	299	129	1590	43
22	3.2	3.4	.74	11	14	55	12	83	410	63	282	34
23	4.0	2.9	.74	14	11	45	12	97	362	39	209	30
24	5.0	2.6	.78	17	8.8	42	10	178	206	34	167	29
25	5.0	2.4	.89	12	7.8	40	8.7	706	161	32	1340	27
26	5.0	2.6	.85	9.0	7.2	38	8.8	453	135	32	990	24
27	5.4	2.8	.94	9.8	8.4	34	11	250	189	125	639	22
28	6.7	2.7	1.2	8.4	10	34	25	193	225	108	229	20
29	10	2.9	1.1	7.4	--	34	36	156	224	579	157	18
30	13	3.0	1.0	6.8	--	33	28	128	125	143	160	18
31	7.2	--	.99	6.4	--	30	--	111	--	84	115	--
TOTAL	150.1	124.5	57.59	288.15	293.6	2752.6	543.5	5225	16978	2603	9371	1690
MEAN	4.84	4.15	1.86	9.30	10.5	88.8	18.1	169	566	84.0	302	56.3
MAX	13	7.3	4.0	25	18	317	36	706	7310	579	2230	230
MIN	1.8	2.4	.74	.95	6.0	5.6	8.7	19	77	32	26	18
AC-FT	298	247	114	572	582	5460	1080	10360	33680	5160	18590	3350
CFSM	.05	.04	.02	.09	.11	.91	.18	1.72	5.77	.86	3.08	.57
IN.	.06	.05	.02	.11	.11	1.04	.21	1.98	6.44	.99	3.55	.64

CAL YR 1989 TOTAL 4937.99 MEAN 13.5 MAX 650 MIN .74 AC-FT 9790 CFSM .14 IN. 1.87
WTR YR 1990 TOTAL 40077.04 MEAN 110 MAX 7310 MIN .74 AC-FT 79490 CFSM 1.12 IN. 15.20

IOWA RIVER BASIN

05454500 IOWA RIVER AT IOWA CITY, IA

LOCATION.--Lat 41°39'24", long 91°32'27", in SE1/4 SE1/4 sec.9, T.79 N., R.6 W., Johnson County, Hydrologic Unit 07080209, on right bank 25 ft downstream from Hydraulics Laboratory of University of Iowa in Iowa City, 175 ft downstream from University Dam, 0.8 mi upstream from Ralston Creek, 3.6 mi downstream from Clear Creek, and at mile 74.2.

DRAINAGE AREA.--3,271 mi².

PERIOD OF RECORD.--June 1903 to current year. Monthly discharge only for some periods, published in WSP 1308.

GAGE.--Water-stage recorder. Datum of gage is 29.00 ft above Iowa City datum, and 617.27 ft above NGVD. Oct. 1, 1934 to Sept. 30, 1972, at datum 10.00 ft higher. See WSP 1708 for history of changes prior to Oct. 1, 1984.

REMARKS.--Estimated daily discharges: Jan. 4. Records good except those for estimated daily discharges, which are fair. Slight fluctuation at low stages caused by powerplant above station. Flow regulated by Coralville Lake (station 05453510), 9.1 mi upstream, since Sept. 17, 1958. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--87 years, 1,721 ft³/s, 7.14 in/yr, 1,247,000 acre-ft/yr; median of yearly mean discharges, 1,470 ft³/s, 6.1 in/yr, 1,060,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,500 ft³/s June 8, 1918, gage height, 19.6 ft, from graph based on gage readings, site and datum then in use; minimum daily discharge, 29 ft³/s Oct. 21, 22, 1916, regulated.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 17, 1881, reached a stage of 21.1 ft, from floodmarks at site and datum in use 1913-21, from information by local resident, discharge, 51,000 ft³/s. Maximum stage known since at least 1850, about 3 ft higher than that of July 17, 1881, occurred in June 1851, discharge, 70,000 ft³/s, estimated.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,500 ft³/s June 17, gage height, 23.29 ft; minimum daily discharge, 127 ft³/s Oct. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	134	141	147	132	140	194	1210	1300	5610	8110	2840	7190
2	136	137	145	135	138	196	1190	1300	5670	8100	1180	7140
3	134	138	142	134	140	195	986	1260	5650	8080	1030	7210
4	133	139	143	134	137	197	768	1650	5520	8060	1090	7150
5	149	141	144	135	142	197	701	2220	5420	8070	1720	7050
6	140	137	141	137	155	194	682	2250	5410	8000	3980	6990
7	137	142	136	139	172	193	674	1970	5320	7980	6920	6940
8	134	139	142	135	173	567	617	1800	5140	8020	7510	6870
9	135	136	141	137	181	1120	569	1560	2960	8050	7550	6810
10	135	133	138	138	167	1200	647	1280	3930	8080	7540	6750
11	134	136	135	138	160	2210	700	1260	5330	8050	7520	6670
12	134	134	135	138	381	3590	690	1900	5290	7940	7650	6320
13	133	135	135	136	637	4600	714	2780	5260	7900	7570	5430
14	135	136	135	140	642	5250	852	2960	5350	7860	7480	5220
15	133	135	133	141	634	5350	939	2910	5220	7830	7440	4690
16	133	133	135	143	630	5090	811	3140	7250	7750	7410	4210
17	129	134	136	154	637	4990	676	3830	10500	7410	7430	3560
18	127	133	136	156	527	4930	635	4080	3370	7130	7390	3070
19	130	136	135	151	402	4620	598	3680	2010	7100	7640	2400
20	129	137	135	154	299	3660	620	4350	2290	7080	9150	2400
21	129	136	131	149	194	3070	624	4900	2310	7030	4410	1880
22	129	140	134	145	224	2600	622	4430	4830	6160	2250	1240
23	131	141	133	147	258	2420	616	4630	7190	6610	6340	1140
24	132	144	136	146	220	2020	606	5210	7550	7120	7380	1140
25	134	141	135	147	201	1500	610	5270	7980	7100	7390	1140
26	136	138	133	142	199	1500	627	1910	8070	7080	5750	1130
27	133	137	130	142	196	1510	711	2040	8120	7080	5940	1110
28	138	142	131	141	194	1510	895	3350	8230	6820	6790	1110
29	142	145	130	138	---	1370	1000	4930	8280	6330	7340	987
30	159	148	132	137	---	1210	1150	5550	8190	3720	7330	886
31	144	---	132	137	---	1210	---	5580	---	3610	7240	---
TOTAL	4191	4144	4226	4378	8180	68463	22740	95280	173250	225260	186200	125833
MEAN	135	138	136	141	292	2208	758	3074	5775	7266	6006	4194
MAX	159	148	147	156	642	5350	1210	5580	10500	8110	9150	7210
MIN	127	133	130	132	137	193	569	1260	2010	3610	1030	886
AC-FT	8310	8220	8380	8680	16230	135800	45100	189000	343600	446800	369300	249600

CAL YR 1989 TOTAL 109656 MEAN 300 MAX 2670 MIN 116 AC-FT 217500
WTR YR 1990 TOTAL 922145 MEAN 2526 MAX 10500 MIN 127 AC-FT 1829000

05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IA

LOCATION.--Lat 41°39'05", long 91°30'27", in SW1/4 NE1/4 sec.14, T.79 N., R.6 W., Johnson County, Hydrologic Unit 07080209, on right bank 60 ft downstream from bridge on Muscatine Avenue in Iowa City, and 1.2 mi upstream from mouth.

DRAINAGE AREA.--2.94 mi².

PERIOD OF RECORD.--October 1963 to current year.

REVISED RECORDS.--WDR IOWA 1966: Drainage area.

GAGE.--Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 678.03 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 20 to Feb. 10, Feb. 14 to Mar. 8, Mar. 19-21, and Mar. 25. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--27 years, 2.38 ft³/s, 11.00 in/yr, 1,720 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,070 ft³/s July 17, 1972, gage height, 9.47 ft; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 14, 1962, reached a stage of 10.5 ft, from flood profile, discharge not determined.

EXTREMES FOR CURRENT YEAR.-- Peak discharges greater than base discharge of 200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 16	0615	400	6.94	July 21	0530	247	5.32
June 16	1605	540	7.78	July 28	2335	358	6.53
June 17	0350	*542	*7.79	Aug. 20	0015	365	6.61

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.05	.05	.00	.06	.12	.15	1.4	.14	1.8	1.6	1.8	1.6
2	.05	.03	.00	.30	.17	.17	.66	.34	3.1	1.4	1.7	1.4
3	.12	.01	.00	1.0	.15	.17	.79	2.6	1.5	1.3	1.4	1.8
4	.07	.00	.00	1.8	.13	.16	1.1	24	1.4	1.9	1.7	1.3
5	1.7	.00	.00	1.0	.20	.14	1.0	8.9	5.6	4.1	1.0	1.1
6	.14	.00	.00	.50	.19	.11	.81	4.5	1.8	1.4	.89	.97
7	.09	.11	.00	.30	.22	.20	.94	2.9	3.0	1.1	1.2	1.1
8	.09	.02	.00	.25	.26	.90	1.1	2.4	14	.90	1.1	.77
9	.06	.00	.00	.30	.24	1.6	3.2	2.7	2.6	.81	.92	.76
10	.04	.00	.00	.35	.21	5.5	1.9	1.7	1.8	4.6	.87	.67
11	.02	.00	.00	.30	.20	11	1.2	1.5	1.5	5.1	.70	.58
12	.00	.00	.00	.25	.22	3.2	1.2	11	1.3	1.8	.40	.54
13	.04	.00	.00	.30	.18	6.5	3.6	4.0	1.9	1.4	.36	.49
14	.06	.00	.00	.35	.04	6.8	1.5	2.7	13	1.3	.34	.42
15	.01	.00	.00	.45	.04	8.0	.57	3.0	2.3	1.1	.76	.39
16	.03	.00	.00	.60	.03	2.9	.69	9.9	150	1.4	.57	.37
17	.28	.00	.00	.60	.03	2.2	.40	3.3	106	.73	5.1	.34
18	.17	.00	.00	.20	.04	1.7	.39	2.1	6.3	.67	.66	1.2
19	.12	.00	.00	.15	.05	1.4	.36	2.6	19	.65	46	.52
20	.10	.00	.00	.14	.04	1.6	1.3	2.0	6.4	1.1	68	.44
21	.10	.00	.00	.15	.06	1.8	.35	1.9	4.5	26	6.5	1.6
22	.09	.00	.00	.20	.15	1.9	.31	1.7	10	3.2	4.1	.64
23	.08	.00	.00	.25	.20	1.5	.34	2.9	4.7	2.0	3.0	.47
24	.07	.00	.00	.15	.15	1.5	.41	9.5	3.3	1.6	2.5	.47
25	.01	.00	.00	.11	.13	1.3	.20	35	2.5	1.3	21	.37
26	.00	.00	.00	.09	.11	1.2	.46	5.7	2.1	3.0	4.3	.27
27	.00	.00	.00	.11	.10	.57	.43	4.0	2.6	3.0	2.9	.20
28	.00	.00	.01	.10	.12	.58	1.3	5.5	3.0	13	2.2	.16
29	.03	.00	.02	.09	---	.94	.24	3.2	2.7	20	3.1	.18
30	1.9	.00	.02	.08	---	.56	.15	2.5	2.1	3.1	2.5	.17
31	.10	---	.02	.09	---	.66	---	2.4	---	2.1	1.9	---
TOTAL	5.62	0.22	0.07	10.62	3.78	66.91	28.30	166.58	381.8	112.66	189.47	21.29
MEAN	.18	.007	.002	.34	.13	2.16	.94	5.37	12.7	3.63	6.11	.71
MAX	1.9	.11	.02	1.8	.26	11	3.6	35	150	26	68	1.8
MIN	.00	.00	.00	.06	.03	.11	.15	.14	1.3	.65	.34	.16
AC-FT	11	.4	.1	21	7.5	133	.56	330	757	223	376	42
CFSM	.06	.00	.00	.12	.05	.73	.32	1.83	4.33	1.24	2.08	.24
IN.	.07	.00	.00	.13	.05	.85	.36	2.11	4.83	1.43	2.40	.27

CAL YR 1989 TOTAL 213.32 MEAN .58 MAX 24 MIN .00 AC-FT 423 CFSM .20 IN. 2.70
WTR YR 1990 TOTAL 987.32 MEAN 2.70 MAX 150 MIN .00 AC-FT 1960 CFSM .92 IN. 12.49

IOWA RIVER BASIN

05455100 OLD MANS CREEK NEAR IOWA CITY, IA

LOCATION.--Lat. 41°36'23", long. 91°36'56", in SE1/4 SW1/4 NW1/4 sec. 36, T.79 N., R.7 W., Johnson County, Hydrologic Unit 07080209, on left bank 10 ft downstream from bridge on county highway W62, 5 miles southwest of Iowa City, 5.9 miles upstream of Dirty Face Creek, and 8.6 miles upstream from mouth.

DRAINAGE AREA.--201 mi².

PERIOD OF RECORD.--October 1950 to September 1964, published in WSP 1914. Annual maximum, water years 1965-84. Occasional low-flow measurements, water years 1964-77; October 1984 to current year.

GAGE.--Water-stage recorder. Datum of gage is 637.49 ft above NGVD. Prior to Nov. 16, 1984, nonrecording gage at same site at datum 2.00 ft higher. Prior to Oct. 1, 1987, at datum 2.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 20-26. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

COOPERATION.--Gage height record and discharge measurements for water years 1951-64 were collected by the U.S. Army Corps of Engineers and computed by the U.S. Geological Survey.

AVERAGE DISCHARGE.--20 years (1951-64, 1985-90), 104 ft³/s, 7.03 in/yr, 75,350 acre-ft/yr; median of yearly mean discharges, 96 ft³/s, 6.5 in/yr, 69,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft³/s May 29, 1962, gage height, 16.52 ft; maximum gage height, 17.20 ft, June 17, 1990, present datum; minimum daily discharge, 0.1 ft³/s for several days in 1957, 1958 and 1964.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 13,500 ft³/s, on the basis of contracted-opening of peak flow, June 15, 1982, gage height, 17.25 ft, present datum.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 25	1200	1,770	11.50	Aug. 21	1215	8,440	16.88
June 17	1900	*10,400	*17.20	Aug. 25	1230	2,580	13.74
July 29	0215	2,200	12.82				

Minimum daily discharge, 2.0 ft³/s Dec. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.8	12	2.8	2.4	10	35	53	42	174	193	246	192
2	5.9	7.4	2.7	2.5	11	35	49	38	167	168	187	173
3	7.0	4.7	2.7	2.5	9.3	30	43	37	184	150	152	496
4	6.1	3.6	2.8	2.9	10	19	42	350	110	131	457	272
5	5.7	3.4	2.8	3.1	9.5	16	39	746	114	125	425	186
6	14	3.6	2.7	15	17	14	32	486	136	113	198	160
7	16	3.9	2.8	31	33	13	29	365	89	100	145	153
8	8.2	3.8	3.0	14	51	14	30	282	751	91	121	127
9	5.0	3.4	3.0	9.8	60	304	31	229	883	79	101	116
10	4.2	3.4	2.9	24	55	107	33	187	303	261	86	104
11	4.7	3.7	2.7	19	37	525	30	143	204	454	75	92
12	5.0	3.7	2.6	24	30	455	26	225	162	209	430	85
13	3.6	3.6	2.5	19	23	387	27	573	137	180	596	79
14	3.9	3.3	2.5	10	43	491	39	334	129	122	209	70
15	3.8	3.1	2.6	7.4	67	636	37	256	106	106	131	66
16	3.7	3.1	2.6	6.2	48	400	35	325	1210	97	101	62
17	3.7	3.1	2.6	9.8	24	272	32	230	5720	82	95	58
18	3.4	2.9	2.3	25	18	206	28	176	5030	67	182	58
19	3.4	3.1	2.3	54	12	162	27	177	2700	71	110	67
20	3.7	2.9	2.2	20	9.7	140	31	197	2440	126	2070	59
21	3.5	3.0	2.1	17	8.1	134	34	137	2200	254	5690	80
22	3.1	3.2	2.0	14	29	119	29	115	937	207	3440	60
23	4.4	3.3	2.0	14	97	91	28	129	843	118	721	48
24	6.0	3.3	2.2	26	66	80	28	256	478	88	500	46
25	2.5	3.2	2.4	51	67	80	26	1320	367	73	1720	46
26	7.2	3.1	2.3	44	36	74	23	1280	302	66	1030	43
27	4.3	3.2	2.7	24	24	65	27	542	409	366	458	38
28	3.0	3.1	2.4	14	36	63	40	375	337	297	356	36
29	3.3	3.0	2.3	11	---	61	68	291	350	1600	291	34
30	5.6	3.0	2.3	10	---	61	49	242	229	868	260	34
31	9.5	---	2.3	11	---	56	---	203	---	355	219	---
TOTAL	189.7	113.1	78.1	537.6	940.6	5145	1045	10288	27201	7217	20802	3140
MEAN	6.12	3.77	2.52	17.3	33.6	166	34.8	332	907	233	671	105
MAX	2.5	12	3.0	54	97	636	68	1320	5720	1600	5690	496
MIN	3.0	2.9	2.0	2.4	8.1	13	23	37	89	66	75	34
AC-FT	376	224	155	1070	1870	10210	2070	20410	53950	14310	41260	6230
CFSM	.03	.02	.01	.09	.17	.83	.17	1.65	4.51	1.16	3.34	.52
IN.	.04	.02	.01	.10	.17	.95	.19	1.90	5.03	1.34	3.85	.58

CAL YR 1989	TOTAL	8483.9	MEAN	23.2	MAX	1310	MIN	1.9	AC-FT	16830	CFSM	.12	IN.	1.57
WTR YR 1990	TOTAL	76697.1	MEAN	210	MAX	5720	MIN	2.0	AC-FT	152100	CFSM	1.05	IN.	14.19

05455500 ENGLISH RIVER AT KALONA, IA

LOCATION.--Lat 41°27'59", long 91°42'56", in SE1/4 SE1/4 sec.13, T.77 N., R.8 W., Washington County, Hydrologic Unit 07080209, on right bank 30 ft upstream from bridge on State Highway 1, 0.8 mi south of Kalona, 1.1 mi upstream from Camp Creek, 4.5 mi downstream from Smith Creek, and 14.5 mi upstream from mouth.

DRAINAGE AREA.--573 mi².

PERIOD OF RECORD.--September 1939 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1940 (M), 1941. WSP 1708: 1956, 1957 (P), 1958 (P).

GAGE.--Water-stage recorder. Datum of gage is 633.45 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to Dec. 27, 1939, nonrecording gage 30 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 18 and Nov. 22 to Mar. 6. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--51 years, 370 ft³/s, 8.77 in/yr, 268,100 acre-ft/yr; median of yearly mean discharges, 330 ft³/s, 7.8 in/yr, 239,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft³/s Sept. 21, 1965, gage height, 21.45 ft; minimum daily discharge, 0.66 ft³/s Feb. 5-7, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1930 reached a stage of 19.9 ft, from floodmark, from information by local residents, discharge, 18,500 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 27	0015	4,860	14.94	July 31	0130	5,460	15.64
June 18	2115	*15,600	*20.06	Aug. 22	0515	6,480	16.57

Minimum daily discharge, 5.7 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	38	17	6.9	40	37	256	231	533	556	1720	316
2	46	42	14	8.0	37	45	245	192	482	495	813	282
3	42	39	11	9.5	35	50	223	174	474	447	619	392
4	38	34	13	19	40	47	205	811	386	403	1800	332
5	37	32	16	45	48	44	199	2580	341	355	2520	272
6	40	33	15	36	54	47	181	1310	350	333	1310	231
7	57	32	12	31	66	49	162	849	320	317	673	210
8	54	30	12	28	76	63	154	660	1530	288	523	189
9	43	29	15	31	85	635	156	552	2690	269	438	352
10	36	29	16	30	76	778	157	496	973	297	375	273
11	33	28	15	34	63	1720	158	421	588	886	334	201
12	31	27	13	32	54	2160	142	433	474	886	301	171
13	29	26	11	25	48	1310	135	1140	409	999	298	153
14	28	26	10	20	56	1850	158	982	373	516	283	140
15	27	25	8.2	30	60	2970	185	708	399	412	243	126
16	26	24	9.0	50	38	2050	169	662	814	412	222	116
17	25	23	9.0	70	29	1120	153	627	6730	364	231	106
18	24	23	7.5	90	25	823	140	504	13100	286	296	103
19	25	22	6.8	120	23	657	128	443	12100	300	247	111
20	28	21	6.7	80	23	555	133	493	9700	338	2280	115
21	27	23	6.0	38	27	508	149	426	7110	1800	3860	122
22	25	21	5.8	45	30	472	150	367	5080	1360	5570	116
23	25	19	5.7	58	36	413	138	360	3730	638	1490	97
24	26	18	6.0	64	40	346	133	531	2670	448	757	87
25	24	20	6.9	49	35	320	125	2830	1420	361	2180	84
26	23	19	6.5	42	29	302	115	4680	1070	311	1360	82
27	24	21	7.2	52	26	277	113	3790	1100	572	686	79
28	23	19	9.3	45	30	259	154	1720	791	755	525	74
29	23	18	8.4	49	---	259	278	983	742	4560	474	70
30	25	19	7.5	43	---	274	287	751	632	4870	402	67
31	30	---	7.3	40	---	269	---	616	---	4640	368	---
TOTAL	996	780	313.8	1320.4	1229	20709	5081	31322	77111	29474	33198	5069
MEAN	32.1	26.0	10.1	42.6	43.9	668	169	1010	2570	951	1071	169
MAX	57	42	17	120	85	2970	287	4680	13100	4870	5570	392
MIN	23	18	5.7	6.9	23	37	113	174	320	269	222	67
AC-FT	1980	1550	622	2620	2440	41080	10080	62130	152900	58460	65850	10050
CFSM	.06	.05	.02	.07	.08	1.17	.30	1.76	4.49	1.66	1.87	.29
IN.	.06	.05	.02	.09	.08	1.34	.33	2.03	5.01	1.91	2.16	.33

CAL YR 1989	TOTAL	31327.7	MEAN	85.8	MAX	3850	MIN	5.5	AC-FT	62140	CFSM	.15	IN.	2.03
WTR YR 1990	TOTAL	206603.2	MEAN	566	MAX	13100	MIN	5.7	AC-FT	409800	CFSM	.99	IN.	13.41

IOWA RIVER BASIN

05455700 IOWA RIVER NEAR LONE TREE, IA

LOCATION.--Lat 41°25'15", long 91°28'25", in NW1/4 NE1/4 sec.6, T.76 N., R.5 W., Louisa County, Hydrologic Unit 07080209, on left bank 2,000 ft downstream from tri-county bridge on county highway W66, 5 mi southwest of Lone Tree, 6.2 mi downstream from English River, and at mile 47.2.

DRAINAGE AREA.--4,293 mi².

PERIOD OF RECORD.--October 1956 to current year.

GAGE.--Water-stage recorder. Datum of gage is 588.16 ft above NGVD. Prior to Dec. 28, 1956, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 18, 19, and Nov. 30 to Feb. 5. Records good except those for estimated daily discharges, which are poor. Flow regulated by Coralville Lake (station 05453510), 36.1 mi upstream, since Sept. 17, 1958. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers gage height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--34 years, 2,813 ft³/s, 8.90 in/yr, 2,038,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,700 ft³/s May 19, 1974, gage height, 18.97 ft; maximum gage height, 20.27 ft Sept. 22, 1965; minimum daily discharge, 69 ft³/s Aug. 4, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 25, 1944, reached a stage of 19.94 ft, discharge not determined, from information by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 26,500 ft³/s June 20, gage height, 18.08 ft; Minimum daily discharge, 165 ft³/s, Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	265	225	205	170	195	331	1710	1610	6240	9730	7820	7760
2	262	231	195	175	185	338	1690	1630	6210	9570	3930	7620
3	266	233	185	180	180	338	1630	1620	6170	9470	2850	7820
4	265	229	190	190	190	331	1360	2360	6010	9370	3020	8050
5	277	222	205	225	210	340	1190	6020	5810	9300	5000	7580
6	293	217	195	215	248	341	1130	5150	5850	9230	4910	7370
7	263	220	185	215	273	328	1090	3830	5720	9140	6660	7260
8	270	220	195	200	314	378	1070	3080	7070	9080	7920	7130
9	262	217	205	205	368	1050	998	2760	8070	9120	8120	7040
10	249	216	200	200	371	2490	992	2290	5370	9280	8090	7120
11	241	211	195	210	374	3550	1050	2080	6050	9970	8040	6890
12	239	210	190	200	333	6080	1040	2180	5930	9990	8100	6740
13	234	207	185	185	551	6100	1030	3920	5790	9960	8690	5940
14	226	210	180	185	661	7330	1090	4700	5800	9440	8250	5580
15	216	206	175	195	670	8710	1260	4160	5720	9140	7990	5080
16	217	201	180	215	627	8330	1290	4070	7260	9160	7870	4810
17	227	205	185	250	662	6670	1090	4330	14400	8800	7910	4150
18	223	195	180	260	646	5940	994	4920	23700	8230	7980	3750
19	217	190	175	270	546	5590	934	4400	25600	8030	7850	3120
20	219	207	175	245	486	4810	933	4460	23600	8020	9560	2810
21	221	200	170	200	378	4110	945	5330	16400	9840	12500	2820
22	219	202	165	205	340	3540	936	5000	12900	9730	11600	1850
23	216	204	175	215	439	3170	926	4870	12400	7790	11000	1470
24	217	201	180	215	480	2990	910	5410	12000	8060	8850	1380
25	213	200	180	200	437	2260	894	8300	10900	7910	9730	1350
26	206	196	175	185	430	2040	875	9060	10300	7710	11000	1350
27	205	198	180	190	381	1980	873	7310	10300	7780	7690	1310
28	208	202	190	185	343	1950	994	6660	10300	8120	7290	1270
29	209	200	185	185	---	1940	1270	6080	10100	10100	8020	1240
30	224	210	180	190	---	1780	1410	6520	10000	10300	8170	1090
31	246	---	175	190	---	1730	---	6360	---	8830	7930	---
TOTAL	7315	6285	5735	6350	11318	96865	33604	140470	301970	280200	244340	138750
MEAN	236	209	185	205	404	3125	1120	4531	10070	9039	7882	4625
MAX	293	233	205	270	670	8710	1710	9060	25600	10300	12500	8050
MIN	205	190	165	170	180	328	873	1610	5370	7710	2850	1090
AC-FT	14510	12470	11380	12600	22450	192100	66650	278600	599000	555800	484600	275200

CAL YR 1989 TOTAL 177780 MEAN 487 MAX 8580 MIN 142 AC-FT 352600
WTR YR 1990 TOTAL 1273202 MEAN 3488 MAX 25600 MIN 165 AC-FT 2525000

IOWA RIVER BASIN

99

05457700 CEDAR RIVER AT CHARLES CITY, IA

LOCATION.--Lat 43°03'45", long 92°40'23", in SE1/4 NE1/4, sec.12, T.95 N., R.16 W., Floyd County, Hydrologic Unit 07080201, on right bank 800 ft downstream from bridge on U.S. Highway 18 (Brantingham Street) in Charles City, 10.6 mi upstream from Gizzard Creek, and at mile 252.9 upstream from mouth of Iowa River.

DRAINAGE AREA.--1,054 mi².

PERIOD OF RECORD.--October 1964 to current year.

GAGE.--Water-stage recorder. Datum of gage is 973.02 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 10, 11, 14-22, 26 to Feb. 4, 17-20, 24, Mar. 1-13, Apr. 16-24, and Aug. 4, 26. Records good except those for estimated daily discharges, which are poor. Occasional minor regulation by dam 0.2 mi upstream from gage. Daily wire-weight gage readings available in district office for period Sept. 13, 1945 to June 30, 1954, at same site and datum. Discharge not published for this period because of extreme regulation of streamflow by power dam 0.2 mi upstream. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector telemeter at station.

AVERAGE DISCHARGE.--26 years, 698 ft³/s, 8.99 in/yr, 505,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,000 ft³/s Apr. 7, 1965, gage height, 19.14 ft; maximum gage height, 21.64 ft Mar. 2, 1965, backwater from ice; minimum discharge, 45 ft³/s Nov. 17, 1989, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 27, 1961, reached a stage of 21.6 ft, from floodmarks, discharge, 29,200 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 25	1830	8,090	10.99	Aug. 20	unknown	8,520	11.78
July 30	1215	*11,300	*14.24	Aug. 26	----	6,100	----
Aug. 4	unknown	6,750	9.94				

Minimum discharge, 45 ft³/s Nov. 17, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	136	158	122	80	95	140	272	1340	631	850	3850	1170
2	131	148	138	82	88	130	271	1040	608	738	2130	958
3	128	138	122	86	94	140	264	992	771	649	3340	916
4	121	136	88	84	96	150	262	963	1920	551	6360	823
5	136	141	122	78	98	170	255	919	1590	502	4810	755
6	133	137	128	82	102	180	250	865	1210	457	2240	695
7	146	141	109	80	100	190	244	817	942	425	1750	642
8	144	145	101	80	101	220	217	770	790	434	1420	670
9	139	147	95	84	105	500	233	735	693	521	1180	1080
10	135	141	102	83	102	800	248	741	623	707	998	933
11	132	141	86	84	107	1100	257	1340	552	614	852	758
12	127	137	75	80	117	1400	256	1500	807	577	759	668
13	125	135	68	74	156	1700	251	1170	2630	568	675	606
14	125	134	66	78	176	1530	252	1020	2350	601	600	554
15	128	132	66	86	136	2130	257	1020	2300	593	544	510
16	138	125	68	95	145	2830	250	1220	1800	529	500	478
17	132	71	70	90	170	2270	250	1280	1440	473	626	453
18	124	90	68	85	150	1500	240	1230	1720	444	779	454
19	124	100	66	80	130	1060	245	1160	1780	807	3100	461
20	123	147	64	84	120	763	255	1630	1630	966	7350	449
21	122	128	62	82	118	630	250	2280	1720	1220	3860	432
22	123	135	60	88	126	562	240	1890	1530	1070	2190	417
23	124	82	66	94	131	504	400	1510	1680	787	1890	397
24	124	91	70	99	160	440	1300	1130	1490	640	1610	383
25	123	120	82	95	183	386	6240	1080	1180	551	4420	379
26	124	123	86	90	142	354	3730	974	997	795	5820	375
27	124	152	82	95	143	334	1690	916	923	3930	4010	363
28	130	137	84	88	156	314	1150	865	913	7410	2300	353
29	132	80	80	95	---	296	2640	811	993	8090	2050	480
30	141	114	74	103	---	283	2100	740	995	10700	1750	467
31	159	--	77	92	---	273	---	675	--	7510	1370	--
TOTAL	4053	3806	2647	2676	3547	23279	24769	34623	39208	54708	75133	18079
MEAN	131	127	85.4	86.3	127	751	826	1117	1307	1765	2424	603
MAX	159	158	138	103	183	2830	6240	2280	2630	10700	7350	1170
MIN	121	71	60	74	88	130	217	675	552	425	500	353
AC-FT	8040	7550	5250	5310	7040	46170	49130	68670	77770	108500	149000	35860
CFSM	.12	.12	.08	.08	.12	.71	.78	1.06	1.24	1.67	2.30	.57
IN.	.14	.13	.09	.09	.13	.82	.87	1.22	1.38	1.93	2.65	.64

CAL YR 1989 TOTAL 83311 MEAN 228 MAX 2100 MIN 60 AC-FT 165200 CFSM .22 IN. 2.94
WTR YR 1990 TOTAL 286529 MEAN 785 MAX 10700 MIN 60 AC-FT 568300 CFSM .74 IN. 10.11

IOWA RIVER BASIN

05458000 LITTLE CEDAR RIVER NEAR IONIA, IA

LOCATION.--Lat. 43°02'05", long. 92°30'05", in SW1/4 NE1/4 sec.21, T.95 N., R.14 W., Chickasaw County, Hydrologic Unit 07080201, on left bank 12 ft downstream from bridge on county highway B57, 2.4 mi west of Ionia, 6.4 mi upstream from mouth, and 7.6 mi downstream from Beaver Creek.

DRAINAGE AREA.--306 mi².

PERIOD OF RECORD.--October 1954 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1708: 1959.

GAGE.--Water-stage recorder. Datum of gage is 973.35 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 18 to Mar. 12. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--36 years, 171 ft³/s, 7.59 in/yr, 123,900 acre-ft/yr; median of yearly mean discharges, 150 ft³/s, 6.7 in/yr, 109,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft³/s Mar. 27, 1961, gage height, 15.58 ft; minimum daily discharge, 3.0 ft³/s Feb. 4-9, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 22, 1954, reached a stage of 11.37 ft, discharge, 4,600 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
July 27	2145	1,430	7.96	Aug. 25	1300	3,530	11.10
Aug. 5	0745	2,480	9.82	Aug. 26	2300	*5,470	*12.88

Minimum daily discharge, 3.1 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.9	16	9.9	4.4	7.4	16	68	284	104	232	290	342
2	6.3	17	8.8	4.6	7.0	19	67	222	100	189	240	307
3	6.2	17	8.0	5.3	7.4	18	65	185	99	167	239	276
4	6.6	17	8.3	5.1	7.6	16	64	159	106	149	1130	241
5	7.8	18	6.8	4.8	7.9	25	62	147	102	120	2000	215
6	8.3	17	7.8	5.1	8.2	24	60	134	102	98	943	193
7	7.5	17	7.6	4.9	7.8	37	58	126	99	88	561	174
8	7.8	17	6.2	5.2	8.2	65	56	123	95	83	401	188
9	8.3	17	4.2	5.7	8.0	130	57	125	88	77	317	183
10	8.8	16	5.3	5.0	7.8	280	61	122	82	73	279	162
11	8.6	16	4.4	5.5	9.4	370	66	148	75	69	241	149
12	8.0	15	3.6	5.1	10	480	69	195	71	75	210	137
13	7.7	16	3.8	4.6	11	404	70	180	138	77	185	128
14	7.6	16	3.6	5.2	10	298	69	155	163	74	164	119
15	8.7	15	3.2	6.2	9.4	885	68	140	166	70	148	112
16	9.7	11	3.2	6.6	9.9	576	67	137	191	66	135	107
17	10	9.8	3.6	6.2	9.6	325	66	135	312	62	191	100
18	12	7.6	3.5	5.9	12	213	66	128	341	60	189	102
19	12	7.9	3.4	5.5	13	153	65	156	281	237	415	105
20	12	10	3.3	6.1	12	132	64	255	286	359	885	103
21	12	9.9	3.2	5.9	15	130	63	354	264	270	1100	98
22	12	9.7	3.1	6.2	14	125	61	313	257	194	673	93
23	11	7.6	3.2	6.6	14	120	60	257	254	161	479	88
24	10	7.7	3.8	6.8	13	109	58	220	227	129	470	84
25	10	7.2	4.2	6.4	11	93	151	194	201	111	2600	81
26	10	9.5	4.5	6.6	13	89	427	176	173	210	3710	78
27	10	7.4	4.3	7.0	14	84	223	162	154	1210	3260	76
28	11	6.3	4.6	6.7	13	79	184	145	359	977	1170	74
29	12	5.6	5.0	7.4	---	75	353	131	491	881	674	73
30	14	7.6	4.1	7.6	---	72	469	119	306	485	519	70
31	16	---	4.3	6.9	---	69	---	111	---	362	408	---
TOTAL	298.8	371.8	152.8	181.1	290.6	5511	3337	5438	5687	7415	24226	4258
MEAN	9.64	12.4	4.93	5.84	10.4	178	111	175	190	239	781	142
MAX	16	18	9.9	7.6	15	885	469	354	491	1210	3710	342
MIN	6.2	5.6	3.1	4.4	7.0	16	56	111	71	60	135	70
AC-FT	593	737	303	359	576	10930	6620	10790	11280	14710	48050	8450
CFSM	.03	.04	.02	.02	.03	.58	.36	.57	.62	.78	2.55	.46
IN.	.04	.05	.02	.02	.04	.67	.41	.66	.69	.90	2.95	.52

CAL YR 1989	TOTAL 12003.5	MEAN 32.9	MAX 580	MIN 3.1	AC-FT 23810	CFSM .11	IN. 1.46
WTR YR 1990	TOTAL 57167.1	MEAN 157	MAX 3710	MIN 3.1	AC-FT 113400	CFSM .51	IN. 6.95

IOWA RIVER BASIN

101

05458500 CEDAR RIVER AT JANESVILLE, IA

LOCATION.--Lat. 42°38'54", long 92°27'54", in NE1/4 SW1/4 sec.35, T.91 N., R.14 W., Bremer County, Hydrologic Unit 07080201, on left bank 300 ft downstream from bridge on county highway at Janesville, 3.6 mi upstream from West Fork Cedar River, and at mile 207.7 upstream from mouth of Iowa River.

DRAINAGE AREA.--1,661 mi².

PERIOD OF RECORD.--October 1904 to Sept. 1906, October 1914 to September 1927, October 1932 to September 1942, October 1945 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as Red Cedar River at Janesville, 1905-06.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1906 (M), 1915-16 (M), 1917, 1918-19 (M), 1920-27, 1933-37 (M), 1940-42 (M).

GAGE.--Water-stage recorder. Datum of gage is 868.26 ft above NGVD. Prior to July 26, 1919, nonrecording gage at site 1,000 ft downstream at datum 4.0 ft lower. July 26, 1919, to Sept. 30, 1927, Nov. 14, 1932, to Sept. 30, 1942, and Apr. 26, 1946, to Nov. 10, 1949, nonrecording gage at county bridge 300 ft upstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 17-19, 23, 24, 28-30, and Dec. 7 to Feb. 20. Records good except those for estimated daily discharges, which are poor. Diurnal fluctuation during low water caused by powerplant at Waverly, 10 mi upstream. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--70 years (water years 1905-06, 1915-27, 1933-42, 1946-90), 861 ft³/s, 7.04 in/yr, 623,800 acre -ft/yr; median of yearly mean discharges, 760 ft³/s, 6.2 in/yr, 551,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,000 ft³/s Mar. 28, 1961, gage height, 16.33 ft; minimum daily discharge, 28 ft³/s Oct. 21, 1922.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 17, 1945, reached a stage of 16.2 ft, from floodmark at site 300 ft upstream, discharge, 34,300 ft³/s. Flood of Mar. 16, 1929, reached a stage of about 16 ft, from information by City of Waterloo, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

		Discharge (ft ³ /s)	Gage height (ft)			Discharge (ft ³ /s)	Gage height (ft)
Date	Time			Date	Time		
Apr. 27	0800	5,590	6.18	Aug. 21	2115	8,610	8.31
July 30	0630	*12,800	*10.30	Aug. 27	1930	12,700	10.29
Aug. 6	1130	8,000	7.92				

Minimum daily discharge, 66 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	140	190	243	88	120	146	454	3210	931	1640	11100	2860
2	141	190	248	90	100	144	443	2350	871	1470	6640	2420
3	255	185	202	100	110	146	414	1770	864	1260	3880	2120
4	134	187	202	96	120	164	403	1450	903	1210	3440	2290
5	173	186	170	90	150	191	392	1220	1780	997	6230	1940
6	148	184	186	94	160	194	379	1090	1920	852	7790	1700
7	147	189	180	90	130	210	371	945	1500	684	5290	1490
8	144	195	150	94	150	410	326	830	1240	612	3540	1710
9	148	179	110	100	140	719	320	839	1050	652	2820	1680
10	149	185	130	90	130	994	356	904	839	741	2560	1830
11	146	186	110	96	120	1220	388	898	837	906	2040	1660
12	145	179	94	90	130	1490	340	1490	773	1100	1900	1480
13	144	183	96	82	145	2100	372	1900	895	993	1710	1270
14	147	183	90	89	250	2650	371	1720	2040	846	1450	1190
15	148	182	82	102	200	2720	356	1420	2650	841	1050	1110
16	182	177	80	120	160	2680	362	1270	2630	817	929	1020
17	162	140	88	110	190	3200	361	1330	2890	720	1020	932
18	153	120	84	96	170	3100	350	1440	2580	693	1360	942
19	150	140	76	90	155	2330	353	1820	2370	777	1820	1170
20	149	165	72	98	140	1470	366	2440	2440	1210	3200	778
21	148	167	70	94	183	1250	376	2230	2310	1720	7140	970
22	149	172	66	98	161	1050	363	2720	2460	1660	6910	876
23	154	150	74	110	183	847	331	2610	2770	1500	4560	839
24	152	160	84	120	182	692	315	2250	2430	1120	3250	801
25	155	163	90	110	230	735	369	1800	2210	975	5140	781
26	154	215	95	100	237	586	2650	1600	1950	926	8560	689
27	153	188	90	110	177	532	5020	1470	1470	3560	11700	707
28	162	178	94	100	232	536	3030	1320	1970	8210	10700	691
29	165	160	100	115	---	508	2080	1250	1650	10100	5700	647
30	193	200	84	130	---	488	2680	1130	1750	12300	4300	740
31	201	--	86	100	---	467	--	1040	--	11400	3750	--
TOTAL	4891	5278	3626	3092	4555	33969	24691	49756	52973	72492	141479	39313
MEAN	158	176	117	99.7	163	1096	823	1605	1766	2338	4564	1310
MAX	255	215	248	130	250	3200	5020	3210	2890	12300	11700	2860
MIN	134	120	66	82	100	144	315	830	773	612	929	647
AC-FT	9700	10470	7190	6130	9030	67380	48970	98690	105100	143800	280600	77980
CFSM	.09	.11	.07	.06	.10	.66	.50	.97	1.06	1.41	2.75	.79
IN.	.11	.12	.08	.07	.10	.76	.55	1.11	1.19	1.62	3.17	.88

CAL YR 1989	TOTAL 126323	MEAN 346	MAX 3980	MIN 66	AC-FT 250600	CFSM .21	IN. 2.83
WTR YR 1990	TOTAL 436115	MEAN 1195	MAX 12300	MIN 66	AC-FT 865000	CFSM .72	IN. 9.77

IOWA RIVER BASIN

05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IA

LOCATION.--Lat. 42°37'50", long. 92°32'24", in SW1/4 SE1/4 sec. 6, T. 90 N., R. 14 W., Black Hawk County, Hydrologic Unit 07080204, on left bank 100 ft downstream from bridge on county highway C55 at Finchford, 3.2 mi upstream from Shell Rock River, and 5.0 mi upstream from mouth.

DRAINAGE AREA.--846 mi².

PERIOD OF RECORD.--October 1945 to current year. Prior to October 1955, published as West Fork Shell Rock River at Finchford.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1946 (M), 1947.

GAGE.--Water-stage recorder. Datum of gage is 867.54 ft above NGVD. Prior to June 10, 1955, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 20 to Mar. 10, May 19-21, June 6, July 21-28, and Aug. 29. Records good except those for estimated daily discharges, which are poor. An authorized diversion of 2,100 acre-ft is made into Big Marsh, 16 mi upstream from gage, each year between September 1 and November 15. Net effect on daily flows at gage is unknown. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemetered at station.

AVERAGE DISCHARGE.--45 years, 502 ft³/s, 8.06 in/yr, 363,700 acre-ft/yr; median of yearly mean discharges, 430 ft³/s, 6.9 in/yr, 312,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,900 ft³/s June 27, 1951, gage height, 17.25 ft; maximum gage height, 18.45 ft, July 29, 1990; minimum daily discharge, 5.9 ft³/s Feb. 26, 27, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1929 reached a stage of about 14 ft, from information by local resident, discharge, about 12,800 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge		Gage height		Date	Time	Discharge		Gage height	
		(ft ³ /s)	(ft)	(ft)	(ft)			(ft ³ /s)	(ft)	(ft)	(ft)
May 22	1230	2,610	10.79			July 29	2215	*23,300			*18.45
June 25	0445	3,760	11.60								

Minimum daily discharge, 8.8 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	26	31	13	16	31	180	367	509	1690	5390	1190
2	13	30	32	13	13	32	173	320	471	1350	4070	974
3	13	27	26	15	15	34	167	289	449	1030	3210	870
4	13	26	26	14	16	41	161	267	464	848	2660	800
5	19	25	22	13	20	51	153	233	624	730	2230	730
6	17	24	24	14	21	54	147	249	1300	642	1870	668
7	15	25	23	13	17	61	141	232	1090	567	1580	606
8	14	24	19	14	20	93	136	218	893	508	1320	635
9	12	23	14	15	18	120	135	234	750	456	1140	613
10	12	23	17	14	17	250	140	266	653	421	1100	570
11	12	22	14	14	15	477	145	358	581	403	1140	532
12	12	22	12	13	16	642	150	411	529	417	1060	493
13	11	22	12	12	18	850	155	399	581	547	906	458
14	11	21	12	13	33	660	157	362	1080	692	817	427
15	11	21	11	15	26	698	156	332	1400	603	750	372
16	18	15	10	18	20	900	155	317	1400	528	696	343
17	14	14	12	16	24	814	151	298	1700	471	692	320
18	13	19	11	14	21	603	146	284	2080	427	760	318
19	13	19	9.8	13	19	471	144	500	2520	416	914	358
20	14	22	9.6	14	17	385	146	2200	3310	692	1120	399
21	14	22	9.2	13	22	345	148	2000	3340	1200	1070	375
22	14	23	8.8	14	21	321	148	2540	3600	1100	982	352
23	14	19	10	16	27	294	146	2220	3510	900	908	329
24	15	20	11	17	29	271	143	1530	3500	800	833	315
25	16	21	12	15	40	252	139	1170	3690	750	1170	305
26	16	27	13	14	44	236	136	1000	3110	720	1880	298
27	16	23	13	15	34	224	150	886	2280	1800	1990	289
28	19	22	13	14	48	212	208	819	1650	4960	2280	279
29	19	19	14	16	---	202	329	734	1430	16000	2450	270
30	24	25	12	18	---	194	410	635	1640	17100	2130	261
31	25	---	12	13	---	186	---	562	---	8480	1600	--
TOTAL	462	671	475.4	445	647	10004	4995	22252	50134	67248	50718	14749
MEAN	14.9	22.4	15.3	14.4	23.1	323	166	718	1671	2169	1636	492
MAX	25	30	32	18	48	900	410	2540	3690	17100	5390	1190
MIN	11	14	8.8	12	13	31	135	218	449	403	692	261
AC-FT	916	1330	943	883	1280	19840	9910	44140	99440	133400	100600	29250
CFSM	.02	.03	.02	.02	.03	.38	.20	.85	1.98	2.56	1.93	.58
IN.	.02	.03	.02	.02	.03	.44	.22	.98	2.20	2.96	2.23	.65

CAL YR 1989	TOTAL	27826.4	MEAN	76.2	MAX	1130	MIN	8.8	AC-FT	55190	CFSM	.09	IN.	1.22
WTR YR 1990	TOTAL	222800.4	MEAN	610	MAX	17100	MIN	8.8	AC-FT	441900	CFSM	.72	IN.	9.80

05459500 WINNEBAGO RIVER AT MASON CITY, IA

LOCATION.--Lat $43^{\circ}09'54''$, long $93^{\circ}11'33''$, in NE1/4 NW1/4 sec.3, T.96 N., R.20 W., Cerro Gordo County, Hydrologic Unit 07080203, on right bank 650 ft upstream from Thirteenth Street Bridge in Mason City, 0.1 mi downstream from Calmus Creek, and 1.0 mi upstream from Willow Creek, and at mile 275.8 upstream from mouth of Iowa River.

DRAINAGE AREA.--526 mi².

PERIOD OF RECORD.--October 1932 to current year. Prior to December 1932, monthly discharge only, published in WSP 1308. Prior to October 1959, published as Lime Creek at Mason City.

REVISED RECORDS.--WSP 825: 1935-36. WSP 1438: Drainage area. WSP 1558: 1933-37, 1943 (M), 1945, 1948.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,069.59 ft above NGVD. Prior to Oct. 15, 1934, nonrecording gage at datum 6.47 ft lower. Oct. 15 to Nov. 6, 1934, nonrecording gage at different datum, and Nov. 7, 1934, to Mar. 22, 1935, nonrecording gage at present datum.

REMARKS.--Estimated daily discharges: July 19-28, Aug. 2-5, and 25, 26. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--58 years, 257 ft³/s, 6.64 in/yr, 186,200 acre-ft/yr; median of yearly mean discharges, 210 ft³/s, 5.4 in/yr, 152,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft³/s Mar. 30, 1933, gage height, 15.7 ft; no flow part of each day Aug. 14, 15, 21, 22, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
July 27	0900	2,620	7.62			*2,830	
Aug. 3	1800	2,440	7.40				*7.86

Minimum discharge, 1.2 ft³/s Dec. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.3	23	11	8.5	12	13	62	171	170	166	668	530
2	6.2	23	12	8.4	12	15	60	173	164	146	710	447
3	7.3	21	9.1	8.1	11	15	56	165	167	131	2010	391
4	4.4	20	9.6	8.1	11	16	54	153	169	117	1650	348
5	6.6	19	10	7.8	12	16	57	142	191	102	1250	310
6	8.8	18	12	7.8	11	15	53	128	200	91	1050	276
7	7.2	19	13	7.8	10	16	49	116	192	86	853	266
8	8.9	19	13	8.9	11	50	48	105	177	85	662	445
9	8.1	18	12	9.8	12	117	53	130	165	78	525	361
10	9.4	17	12	8.9	12	97	69	178	148	74	429	311
11	11	17	12	10	12	121	81	213	139	71	363	277
12	14	18	10	9.7	13	204	74	233	134	99	308	226
13	15	17	9.6	9.1	14	165	67	236	163	98	271	193
14	21	18	11	9.6	14	262	64	222	164	85	250	179
15	17	18	10	9.9	14	328	61	211	167	79	225	162
16	14	13	9.4	11	15	295	58	214	201	74	204	147
17	11	13	8.7	12	15	240	59	214	273	70	224	137
18	9.9	12	8.7	12	14	202	58	195	300	67	256	145
19	12	13	9.0	12	13	155	57	252	306	344	524	157
20	13	15	8.7	11	13	141	59	376	319	891	963	152
21	14	14	8.8	11	13	133	58	382	306	663	996	146
22	15	16	4.9	11	12	126	53	382	294	491	927	138
23	17	13	2.5	11	13	115	50	375	308	443	813	129
24	16	14	1.8	12	13	104	108	346	321	412	709	119
25	15	15	2.3	12	13	101	144	324	305	434	2100	115
26	16	15	2.9	13	13	93	149	309	281	1280	2150	106
27	19	16	3.1	12	12	83	149	289	253	2350	1580	97
28	19	12	5.0	12	12	77	159	264	230	1770	1330	94
29	21	11	5.3	12	---	73	170	237	207	1740	1130	89
30	24	11	5.3	12	---	66	170	214	188	1160	856	87
31	24	---	7.3	12	---	62	187	---	804	656	---	
TOTAL	409.1	488	260.0	320.4	352	3516	2409	7136	6602	14501	26642	6580
MEAN	13.2	16.3	8.39	10.3	12.6	113	80.3	230	220	468	859	219
MAX	24	23	13	13	15	328	170	382	321	2350	2150	530
MIN	4.3	11	1.8	7.8	10	13	48	105	134	67	204	87
AC-FT	811	968	516	636	698	6970	4780	14150	13100	28760	52840	13050
CFSM	.03	.03	.02	.02	.02	.22	.15	.44	.42	.89	1.63	.42
IN.	.03	.03	.02	.02	.02	.25	.17	.50	.47	1.03	1.88	.47

CAL YR 1989 TOTAL 16201.4 MEAN 44.4 MAX 831 MIN 1.2 AC-FT 32140 CFSM .08 IN. 1.15
WTR YR 1990 TOTAL 69215.5 MEAN 190 MAX 2350 MIN 1.8 AC-FT 137300 CFSM .36 IN. 4.90

IOWA RIVER BASIN

05460000 CLEAR LAKE AT CLEAR LAKE, IA

LOCATION.--Lat 43°08'01", long 93°22'57", in SE1/4 NE1/4 sec.13, T.96 N., R.22 W., Cerro Gordo County, Hydrologic Unit 07080203, at the public bathing beach in the town of Clear Lake near dam across Clear Creek.

DRAINAGE AREA.--22.6 mi².

PERIOD OF RECORD.--May 1933 to current year. No winter records 1933-52. Record fragmentary November 1952 to June 1959.

GAGE.--Water-stage recorder. Datum of gage is 1,222.24 ft above NGVD, and 4.60 ft below crest of spillway of dam at outlet. See WSP 1708 for history of changes prior to June 25, 1959.

REMARKS.--Lake is formed by concrete dam on Clear Creek with ungated overflow spillway 50 ft long at elevation 1,226.84 ft above NGVD. Dam constructed in 1903. A previous outlet works had been constructed in 1887. Lake is used for conservation and recreation. Area of lake is approximately 3,600 acres.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 5.94 ft July 3, 1951; minimum observed, 0.76 ft Oct. 26, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 2.50 ft Sept. 7; minimum, 0.76 ft Oct. 26.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.12	.92	.83	---	---	.98	1.29	1.10	1.10	1.15	1.97	2.39
2	1.08	.89	.83	---	---	.99	1.25	1.09	1.20	1.12	1.98	2.38
3	1.02	.90	.82	---	---	.98	1.24	1.06	1.19	1.13	2.03	2.37
4	1.01	.91	.82	.79	---	.96	1.23	1.05	1.09	1.08	2.04	2.38
5	1.05	.91	.82	---	---	.95	1.22	1.06	1.09	1.06	2.02	2.37
6	1.04	.90	.81	---	---	.92	1.19	1.05	1.07	1.02	2.01	2.37
7	1.00	.94	.81	---	---	1.00	1.17	1.09	1.06	1.01	2.02	2.36
8	1.00	.93	.81	---	---	1.03	1.16	1.02	1.08	1.01	2.01	2.44
9	.99	.91	.81	---	---	.93	1.17	1.02	1.07	.98	2.00	2.43
10	.98	.90	.80	---	---	.97	1.22	1.12	1.04	.97	1.99	2.41
11	1.00	.86	.80	---	---	1.08	1.21	1.08	1.04	.96	1.98	2.40
12	.96	.86	.80	---	---	1.08	1.19	1.06	1.09	1.03	1.95	2.40
13	.95	.85	.80	---	---	1.24	1.20	1.07	1.13	1.03	1.95	2.39
14	.94	.87	.80	---	---	1.35	1.19	1.06	1.11	1.03	1.96	2.36
15	.94	.86	.80	---	---	1.47	1.21	1.03	1.10	1.03	1.93	2.33
16	.88	.84	---	---	---	1.45	1.18	1.12	1.17	1.02	1.92	2.29
17	.82	.83	---	---	---	1.42	1.22	1.17	1.27	1.04	2.04	2.27
18	.81	---	---	---	---	1.41	1.13	1.04	1.22	1.03	2.06	2.29
19	.80	---	---	---	---	1.36	1.11	1.10	1.22	1.23	2.07	2.31
20	.81	---	---	---	---	.80	1.37	1.21	1.15	1.25	1.33	2.12
21	.80	---	---	---	---	.86	1.35	1.19	1.15	1.22	1.32	2.12
22	.79	---	---	---	---	.89	1.39	1.17	1.15	1.25	1.32	2.12
23	.79	---	---	---	---	1.09	1.33	1.16	1.16	1.24	1.31	2.26
24	.80	---	---	---	---	1.07	1.34	1.14	1.13	1.22	1.30	2.13
25	.79	---	---	---	---	1.05	1.36	1.15	1.13	1.21	1.33	2.23
26	.78	---	---	---	---	1.02	1.30	1.13	1.16	1.21	1.50	2.34
27	.80	.83	---	---	1.00	1.30	1.19	1.16	1.19	1.77	2.37	2.21
28	.84	.83	---	---	---	.98	1.27	1.17	1.16	1.18	1.90	2.38
29	.87	.83	---	---	---	1.27	1.15	1.14	1.14	1.19	1.98	2.39
30	.91	.82	---	---	---	1.28	1.12	1.12	1.18	1.98	2.40	2.19
31	.98	---	---	---	---	1.27	---	1.11	---	1.98	2.39	---
MEAN	.91	---	---	---	---	1.21	1.19	1.10	1.16	1.26	2.10	2.32
MAX	1.12	---	---	---	---	1.47	1.29	1.17	1.27	1.98	2.40	2.44
MIN	.78	---	---	---	---	.92	1.11	1.02	1.04	.96	1.92	2.19

IOWA RIVER BASIN

105

05462000 SHELL ROCK RIVER AT SHELL ROCK, IA

LOCATION.--Lat $42^{\circ}42'43''$, long $92^{\circ}34'58''$, in NW1/4 NE1/4 sec.11, T.91 N., R.15 W., Butler County, Hydrologic Unit 07080202 on right bank 400 ft upstream from bridge on county highway C45 in Shell Rock, 2.2 mi downstream from Curry Creek, and 10.4 mi upstream from mouth.

DRAINAGE AREA.--1,746 mi².

PERIOD OF RECORD.--June 1953 to current year. Prior to July 1953, monthly discharge only, published in WSP 1728.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Rockfill dam since Oct. 19, 1957. Datum of gage is 885.34 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 16 to Feb. 12, 15-20, 25, 26, Aug. 1-6, and Aug. 30 to Sept. 3. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--37 years, 954 ft³/s, 7.42 in/yr, 691,200 acre-ft/yr; median of yearly mean discharges, 770 ft³/s, 6.0 in/yr, 558,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,500 ft³/s Mar. 28, 1961, gage height, 16.26 ft; minimum daily discharge, 27 ft³/s Dec. 22, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1856 reached a stage of 17.7 ft at bridge 400 ft downstream, from information provided by U.S. Army Corps of Engineers, discharge, about 45,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
July 29	0100	*12,800	*13.43				
Aug. 4	1300	5,930	11.35	Aug. 27	0245	10,100	12.80

Minimum daily discharge, 27 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	68	108	62	42	60	72	328	947	686	757	3520	2450
2	69	120	65	44	50	73	322	870	668	686	1670	2110
3	71	112	54	49	56	73	307	798	673	633	2830	1760
4	62	101	56	48	58	74	307	712	658	586	5360	1470
5	65	97	48	46	60	78	304	634	674	554	4260	1300
6	63	98	54	48	64	80	285	585	679	510	3210	1180
7	68	101	53	47	60	86	271	527	658	483	2740	1090
8	67	96	46	50	66	220	270	487	651	465	2310	1240
9	69	96	34	53	64	442	268	506	630	449	1910	1790
10	71	97	42	48	62	609	281	560	600	434	1710	1460
11	70	94	36	51	58	553	310	710	572	428	1610	1250
12	70	85	31	48	65	800	324	825	535	480	1520	1110
13	71	85	33	43	73	968	325	797	802	488	1270	1010
14	71	83	32	42	66	936	315	756	1010	487	1130	920
15	73	87	29	53	64	1230	304	718	904	456	1010	854
16	84	81	29	63	66	1400	291	729	854	433	924	804
17	78	62	33	57	64	1190	286	774	1410	414	999	765
18	78	51	32	49	66	971	284	760	1950	403	1080	767
19	78	57	29	47	71	830	293	1240	1620	433	1350	801
20	77	64	28	51	70	714	308	1900	1720	1620	2730	778
21	75	61	28	49	74	660	284	1910	1540	1780	3700	752
22	75	60	27	50	75	614	272	1730	1650	1650	3270	719
23	76	55	31	56	73	576	263	1510	1960	1360	2810	684
24	77	50	35	61	70	530	252	1340	1640	1090	2450	660
25	75	47	38	56	66	486	452	1220	1390	906	3950	648
26	75	57	41	51	68	458	1200	1140	1200	1100	7860	631
27	75	47	40	56	74	419	1200	1060	1090	4780	8630	617
28	76	49	42	51	72	395	1190	971	1160	11500	5020	601
29	76	66	47	58	---	374	1180	882	922	11200	3770	585
30	88	63	39	65	---	352	1070	796	838	7870	3130	579
31	106	---	40	50	---	334	---	731	---	5480	2770	---
TOTAL	2297	2330	1234	1582	1835	16597	13346	29125	31344	59915	90503	31385
MEAN	74.1	77.7	39.8	51.0	65.5	535	445	940	1045	1933	2919	1046
MAX	106	120	65	65	75	1400	1200	1910	1960	11500	8630	2450
MIN	62	47	27	42	50	72	252	487	535	403	924	579
AC-FT	4560	4620	2450	3140	3640	32920	26470	57770	62170	118800	179500	62250
CFSM	.04	.04	.02	.03	.04	.31	.25	.54	.60	1.11	1.67	.60
IN.	.05	.05	.03	.03	.04	.35	.28	.62	.67	1.28	1.93	.67

CAL YR 1989	TOTAL 74001	MEAN 203	MAX 2130	MIN 27	AC-FT 146800	CFSM .12	IN. 1.58
WTR YR 1990	TOTAL 281493	MEAN 771	MAX 11500	MIN 27	AC-FT 558300	CFSM .44	IN. 6.00

IOWA RIVER BASIN

423122
423104

923104 05463000 BEAVER CREEK AT NEW HARTFORD, IA

LOCATION.--Lat 42°30'50", long 92°37'55", in SE1/4 SE1/4 sec.28, T.90 N., R.15 W., Butler County, Hydrologic Unit 07080205, on right bank 5 ft from right end of bridge on county highway T55, 0.2 mi north of New Hartford, and 8 mi upstream from mouth.

DRAINAGE AREA.--347 mi².

PERIOD OF RECORD.--October 1945 to current year. Prior to April 1948, monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1948-49. WSP 1708: 1947 (M).

GAGE.--Water-stage recorder. Datum of gage is 882.44 ft above NGVD. Prior to July 14, 1959, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 17 to Mar. 9, Aug. 18, 19 and Sept. 20-26. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--45 years, 198 ft³/s, 7.75 in./yr, 143,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft³/s June 13, 1947, gage height, 13.5 ft, from graph based on gage readings, from rating curve extended above 14,000 ft³/s; minimum daily discharge, 2.0 ft³/s Sept. 30, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 20	1730	2,660	9.31	June 30	0345	1,840	8.56
June 18	1800	3,100	9.65	July 21	1445	1,440	7.91
June 20	1800	3,380	9.83	July 29	0245	*6,310	*11.19
June 23	1730	2,710	9.38	Aug. 26	1900	2,400	9.12

Minimum daily discharge, 2.4 ft³/s Oct. 4.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.1	20	13	5.2	5.2	14	102	291	287	692	948	375
2	2.8	23	13	6.0	4.5	15	97	238	266	519	713	316
3	2.5	23	13	6.2	4.7	15	90	206	252	430	589	305
4	2.4	23	12	5.9	4.9	16	85	187	225	360	510	277
5	4.3	24	14	5.6	5.2	18	81	174	235	338	428	244
6	12	23	13	5.6	6.0	19	77	159	487	304	361	223
7	7.8	23	10	5.3	6.8	20	72	146	299	274	318	201
8	7.6	23	9.0	5.6	6.2	50	70	136	245	253	286	440
9	7.5	23	9.8	5.8	7.0	320	68	195	221	226	257	496
10	10	23	10	5.6	8.0	335	74	442	195	216	324	318
11	5.9	22	8.9	5.9	7.2	309	74	423	181	214	903	261
12	4.6	21	8.0	5.8	9.6	640	70	330	177	318	674	232
13	2.7	20	6.8	5.2	9.0	316	71	287	269	516	376	213
14	2.5	20	5.7	5.3	12	359	74	248	552	426	301	200
15	2.7	20	4.8	5.9	15	787	73	223	452	339	261	186
16	7.7	16	5.0	8.4	13	683	71	220	800	280	231	169
17	13	13	4.8	7.6	11	408	68	204	1800	236	265	156
18	11	14	4.6	7.0	10	284	65	179	2740	206	275	156
19	12	15	4.3	7.3	11	216	63	812	2210	209	247	226
20	12	14	4.5	6.9	10	196	69	2200	2970	685	365	279
21	12	14	4.2	6.2	9.5	178	72	2100	2850	1350	445	273
22	11	13	4.3	5.6	9.0	169	70	1120	1930	872	377	249
23	12	14	4.1	5.0	10	157	70	754	2520	502	333	229
24	8.9	15	3.9	5.6	11	141	68	592	2120	376	302	212
25	8.2	14	4.1	5.4	10	138	64	528	1160	310	1010	192
26	8.3	13	4.0	4.7	9.4	130	59	615	790	683	2140	175
27	8.1	14	4.2	5.0	11	130	81	572	632	3240	1600	163
28	8.6	12	4.5	4.5	13	123	279	512	556	4720	764	158
29	13	12	4.9	4.9	---	116	502	436	1370	5110	578	150
30	15	12	4.2	5.2	---	111	389	366	1500	2690	547	144
31	20	---	4.5	4.8	---	106	---	323	---	1450	464	---
TOTAL	259.2	536	221.1	179.0	249.2	6519	3168	15218	30291	28344	17192	7218
MEAN	8.36	17.9	7.13	5.77	8.90	210	106	491	1010	914	555	241
MAX	20	24	14	8.4	15	787	502	2200	2970	5110	2140	496
MIN	2.4	12	3.9	4.5	4.5	14	59	136	177	206	231	144
AC-FT	514	1060	439	355	494	12930	6280	30180	60080	56220	34100	14320
CFSM	.02	.05	.02	.02	.03	.61	.30	1.41	2.91	2.63	1.60	.69
IN.	.03	.06	.02	.02	.03	.70	.34	1.63	3.25	3.04	1.84	.77

CAL YR 1989 TOTAL 12532.4 MEAN 34.3 MAX 1300 MIN 2.0 AC-FT 24860 CFSM .10 IN. 1.34
WTR YR 1990 TOTAL 109394.5 MEAN 300 MAX 5110 MIN 2.4 AC-FT 217000 CFSM .86 IN. 11.73

IOWA RIVER BASIN

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05463050 CEDAR RIVER AT CEDAR FALLS, IA

WATER-QUALITY RECORDS

LOCATION.--Lat 42°32'20", Long 92°26'58", in NW1/4 NE1/4 sec.12, T.89 N, R.14W., Black Hawk County, Hydrologic Unit 07080205, at bridge on U.S. Highway 20 at Cedar Falls, 1.1 mi upstream from Dry Run, and at mile 196.0 upstream from mouth of Iowa River.

DRAINAGE AREA.--4,734 mi².

PERIOD OF RECORD.--October 1975 to September 1979, May 1984 to September 1985, October 1986 to current year.

REMARKS.--Water discharge estimated on basis of records at gaging station 8.1 mi downstream at Waterloo. No significant inflow between gaging station and sampling site.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
NOV 09...	1330	397	555	8.9	7.0	5.5	4.0	15.0	127	740	100
DEC 11...	1345	253	678	8.4	0.0	-10.0	1.2	14.4	100	749	450
MAR 05...	1415	400	570	8.7	3.0	0.0	3.8	13.3	101	748	K13
MAY 02...	1445	4850	520	8.4	14.5	22.0	45	14.0	141	746	K33
JUN 22...	1515	12100	580	8.2	20.0	18.5	31	8.1	92	736	580
AUG 24...	1215	8790	598	8.2	22.0	22.5	17	7.7	91	742	500
<hr/>											
DATE	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HC03 (00453)
NOV 09...	120	240	55	24	24	18	0.7	4.1	205	14	220
DEC 11...	K23	E300	75	27	27	16	0.7	3.3	237	10	270
MAR 05...	K20	250	67	21	21	15	0.6	3.5	217	6	253
MAY 02...	K73	240	65	18	7.5	6	0.2	3.3	145	0	177
JUN 22...	830	280	77	21	7.4	5	0.2	3.0	166	0	203
AUG 24...	450	300	83	22	8.9	6	0.2	3.4	211	0	258
<hr/>											
DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NO2-NO3 DIS- SOLVED (MG/L AS N) (00605)	NITRO- GEN, NO2-NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, NO2-NO3 DIS- SOLVED (MG/L AS N) (00613)
NOV 09...	44	32	0.20	2.8	313	315	0.43	340	0.68	1.40	0.020
DEC 11...	52	41	0.02	6.5	389	391	0.53	266	0.37	3.60	0.010
MAR 05...	40	32	<0.10	8.2	354	339	0.48	382	0.74	3.30	0.070
MAY 02...	38	30	0.50	12	338	301	0.46	4430	1.6	8.90	0.100
JUN 22...	27	31	0.20	15	399	E353	0.54	13000	1.4	16.0	0.100
AUG 24...	39	24	1.1	18	401	376	0.55	9520	1.4	11.0	0.040

K Results based on colony count outside ideal range.

IOWA RIVER BASIN

108

05463050 CEDAR RIVER AT CEDAR FALLS, IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1990

IOWA RIVER BASIN

109

05463500 BLACK HAWK CREEK AT HUDSON, IA

LOCATION.--Lat 42°24'28", long 92°27'47", in SW1/4 NE1/4 sec.27, T.88 N., R.14 W., Black Hawk County, Hydrologic Unit 07080205, on left bank 35 ft downstream from bridge on State Highway 58, 0.2 mi northwest of Chicago and Great Western Railway tracks at the west edge of Hudson, 4.5 mi upstream from Prescotts Creek, and 9.6 mi upstream from mouth.

DRAINAGE AREA.--303 mi².

PERIOD OF RECORD.--April 1952 to current year.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 865.03 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 16-18, Nov. 21 to Mar. 9, and June 15-18. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--38 years, 171 ft³/s, 7.66 in/yr, 123,900 acre-ft/yr; median of yearly mean discharges, 160 ft³/s, 7.2 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,300 ft³/s July 9, 1969, gage height, 18.23 ft; minimum daily discharge, 0.12 ft³/s Jan. 26, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 10	1230	1,410	12.00	June 24	0500	2,130	13.69
May 20	2045	2,670	14.59	June 30	0345	1,670	12.87
June 17	0500	*13,800	*17.32	July 28	0715	7,900	16.38
June 20	2200	2,730	14.42	Aug. 26	2015	2,630	14.31

Minimum discharge, 1.4 ft³/s Oct. 3, 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	20	7.0	2.2	5.4	14	44	164	208	538	692	351
2	1.5	18	7.2	2.4	5.0	15	42	138	196	443	563	303
3	1.4	18	7.2	2.8	5.4	15	38	123	185	386	480	379
4	1.4	16	6.8	2.5	6.0	16	36	114	174	336	424	326
5	1.8	15	7.0	2.2	6.4	18	33	111	397	302	364	272
6	3.1	14	6.2	2.1	6.6	21	31	105	458	272	316	242
7	3.6	14	5.4	2.0	6.2	24	28	98	230	252	284	214
8	3.7	14	4.7	2.0	6.6	100	26	93	209	235	257	345
9	3.9	14	5.0	2.1	6.2	600	25	797	187	210	233	723
10	3.3	14	5.7	2.0	5.6	426	28	1280	171	199	261	354
11	3.1	13	5.2	3.0	5.4	412	28	603	177	197	354	275
12	2.6	12	5.1	2.8	6.2	611	26	419	181	351	344	237
13	2.6	12	3.7	2.6	7.0	213	25	349	192	397	259	210
14	2.5	12	2.9	3.5	8.6	196	27	295	292	310	225	191
15	2.8	13	2.4	5.8	7.6	513	27	258	844	262	203	173
16	4.2	12	2.3	7.6	7.2	437	26	274	4970	226	184	161
17	6.5	11	2.5	6.6	6.8	275	25	234	10900	197	192	146
18	4.0	13	2.4	5.6	7.2	200	23	199	5730	175	310	142
19	5.1	15	2.4	6.0	6.4	152	22	928	2380	174	229	155
20	7.0	13	2.3	5.6	6.2	129	26	2220	2420	277	509	149
21	9.5	10	2.1	5.2	6.2	113	31	1580	1950	336	418	143
22	9.4	9.0	2.2	5.5	6.0	102	35	609	1230	255	304	135
23	8.0	8.0	2.1	5.8	7.2	89	35	471	1790	207	262	126
24	6.3	8.6	2.0	6.0	7.2	77	33	396	1710	178	242	120
25	5.2	8.0	2.1	5.4	7.4	70	30	390	802	161	1210	120
26	5.0	8.4	2.2	4.6	7.0	63	26	476	630	191	2380	114
27	8.2	7.4	2.1	4.9	9.8	56	29	416	534	2260	1620	107
28	7.4	6.0	2.3	4.6	13	50	119	348	546	6930	659	102
29	9.8	6.4	2.6	5.0	--	49	315	298	1260	3410	507	98
30	14	6.8	2.0	5.4	--	48	217	257	1140	1770	564	96
31	18	--	2.1	5.0	--	46	--	227	--	940	421	--
TOTAL	166.4	361.6	117.2	128.8	191.8	5150	1456	14270	42093	22377	15270	6509
MEAN	5.37	12.1	3.78	4.15	6.85	166	48.5	460	1403	722	493	217
MAX	18	20	7.2	7.6	13	611	315	2220	10900	6930	2380	723
MIN	1.4	6.0	2.0	2.0	5.0	14	22	93	171	161	184	96
AC-FT	330	717	232	255	380	10220	2890	28300	83490	44380	30290	12910
CFSM	.02	.04	.01	.01	.02	.55	.16	1.52	4.63	2.38	1.63	.72
IN.	.02	.04	.01	.02	.02	.63	.18	1.75	5.17	2.75	1.87	.80

CAL YR 1989 TOTAL 8189.9 MEAN 22.4 MAX 440 MIN 1.4 AC-FT 16240 CFSM .07 IN. 1.01
WTR YR 1990 TOTAL 108090.8 MEAN 296 MAX 10900 MIN 1.4 AC-FT 214400 CFSM .98 IN. 13.27

IOWA RIVER BASIN

05464000 CEDAR RIVER AT WATERLOO, IA

LOCATION.--Lat $42^{\circ}29'44''$, long $92^{\circ}20'03''$, in NW1/4 NW1/4 sec.25, T.89 N., R.13 W., Black Hawk County, Hydrologic Unit 07080205, on left bank at foot of East Seventh Street, 0.3 mi upstream from Eleventh Avenue bridge in Waterloo, 1.1 mi downstream from Black Hawk Creek, and at mile 187.9 upstream from mouth of Iowa River.

DRAINAGE AREA.--5,146 mi².

PERIOD OF RECORD.--October 1940 to current year. Prior to April 1941, monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1950.

GAGE.--Water-stage recorder. Datum of gage is 824.14 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 9 to Feb. 6, and Feb. 26 to Mar. 1. Records good except those for estimated daily discharges, which are poor. Slight diurnal fluctuation during low flow caused by powerplant upstream from station. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter and U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--50 years, 2,994 ft³/s, 7.90 in/yr, 2,169,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 76,700 ft³/s Mar. 29, 1961, gage height, 21.86 ft; minimum daily discharge, 152 ft³/s Jan. 28, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 16, 1929, reached a stage of about 20 ft, determined by U. S. Army Corps of Engineers, from information by City of Waterloo, discharge, 65,000 ft³/s. Flood of Apr. 2, 1933, reached a stage of about 19.5 ft from information by City of Waterloo, discharge, 61,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 13,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 18	0330	15,600	9.92	Aug. 22	1230	13,400	9.42
July 30	1445	*47,100	*17.38	Aug. 28	0215	24,400	12.60

Minimum discharge, 172 ft³/s Feb. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	334	413	364	240	280	325	1290	5580	3230	6460	26800	8820
2	341	406	342	250	255	349	1240	4930	3060	5430	20400	7120
3	323	405	384	270	240	359	1200	3900	2860	4530	14500	6530
4	401	406	327	260	250	362	1160	3080	2760	4000	11400	6060
5	397	403	367	260	280	388	1130	2770	3330	3690	11900	5520
6	400	393	375	260	300	403	1080	2490	5140	3190	14000	4950
7	367	407	323	250	315	412	1040	2270	4780	2850	13300	4590
8	339	403	322	270	318	691	1020	2050	3880	2500	9760	4390
9	340	397	300	290	318	1480	978	2730	3510	2350	7870	5590
10	353	387	325	270	315	2510	1040	3440	3070	2330	7130	5390
11	355	388	250	280	318	2850	1030	3510	2720	2470	6660	4840
12	350	377	240	260	324	3560	1080	3530	2530	3230	6640	4370
13	344	380	260	230	341	4520	1070	3970	2820	3380	5730	3990
14	345	376	250	230	308	4980	1130	3930	4410	3340	4970	3630
15	350	379	230	255	234	5690	1090	3520	6120	3130	4330	3350
16	436	372	210	280	313	6280	1070	3240	7470	2840	3750	3110
17	383	320	230	300	347	6430	1050	3180	10800	2560	3890	2890
18	360	292	220	300	344	6200	1030	3030	14900	2330	4310	2830
19	358	310	200	280	361	5160	1030	4900	13200	2320	4930	3000
20	355	367	190	280	343	3810	1100	7470	11800	3490	6920	3120
21	350	375	190	270	352	3080	1080	9630	12300	6300	9970	2830
22	346	366	180	270	362	2520	1080	9310	12100	7060	13000	2850
23	350	330	190	290	351	2290	1060	8490	11700	7350	11200	2640
24	350	298	220	300	323	2040	1040	7370	12200	6810	8840	2520
25	351	374	240	270	331	1780	1010	6150	10600	5750	10400	2430
26	351	373	260	255	300	1770	2260	5570	8810	5330	15000	2320
27	351	388	250	270	280	1550	5990	5240	7380	10500	21700	2230
28	376	356	260	260	310	1500	6120	4790	6520	21100	23400	2180
29	376	315	270	280	--	1430	5090	4270	6480	33200	17700	2110
30	427	334	250	300	--	1370	4600	3910	7060	45000	12900	2050
31	422	--	240	265	--	1320	--	3540	--	37400	11100	--
TOTAL	11281	11090	8259	8345	8713	77409	51188	141790	207540	252220	344400	118250
MEAN	364	370	266	269	311	2497	1706	4574	6918	8136	11110	3942
MAX	436	413	384	300	362	6430	6120	9630	14900	45000	26800	8820
MIN	323	292	180	230	234	325	978	2050	2530	2320	3750	2050
AC-FT	22380	22000	16380	16550	17280	153500	101500	281200	411700	500300	683100	234500
CFSM	.07	.07	.05	.05	.06	.49	.33	.89	1.34	1.58	2.16	.77
IN.	.08	.08	.06	.06	.06	.56	.37	1.02	1.50	1.82	2.49	.85

CAL YR 1989 TOTAL 278703 MEAN 764 MAX 6390 MIN 180 AC-FT 552800 CFSM .15 IN. 2.01
WTR YR 1990 TOTAL 1240485 MEAN 3399 MAX 45000 MIN 180 AC-FT 2461000 CFSM .66 IN. 8.97

05464500 CEDAR RIVER AT CEDAR RAPIDS, IA

LOCATION.--Lat 41°58'14", long 91°40'01", in SE1/4 NW1/4 sec.28, T.83 N., R.7 W., Linn County, Hydrologic Unit 07080205, on right bank 400 ft upstream from bridge on Eighth Avenue in Cedar Rapids, 2.7 mi upstream from Prairie Creek, and at mile 112.7 upstream from mouth of Iowa River.

DRAINAGE AREA.--6,510 mi².

PERIOD OF RECORD.--October 1902 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 955: 1924. WSP 1308: 1904, 1906-13, 1915, 1917, 1919-24, 1928, 1930.. WSP 1438: Drainage area. WSP 1558: 1915-18 (M), 1920 (M), 1922 (M), 1929, 1933, 1943.

GAGE.--Water-stage recorder. Datum of gage is 700.47 ft above NGVD. Prior to Aug. 20, 1920, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 17, 18 and Dec. 11-24. Records good except those for estimated daily discharges, which are fair. Flow regulated by city hydroelectric dam 1/2 mile upstream since June 1979. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U. S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--88 years, 3,460 ft³/s, 7.22 in/yr, 2,507,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 73,000 ft³/s Mar. 31, 1961, gage height, 19.66 ft; maximum gage height, 20.0 ft Mar. 18, 1929; minimum observed discharge 28 ft³/s Oct. 31, 1989, caused by accidental gate operations upstream; minimum daily, 140 ft³/s Nov. 18, 1989, caused by accidental gate operations.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1851 reached a stage of about 20 ft, discharge, 65,000 ft³/s, estimated.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 12,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 20	1445	25,900	9.92	Aug. 30	1400	29,000	10.67
Aug. 2	0245	*46,300	*14.57				

Minimum observed discharge, 28 ft³/s Oct. 31 caused by accidental gate operations.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	439	203	327	285	429	494	1860	4800	4630	10600	43800	19500
2	436	210	387	269	359	532	1720	4940	4330	9330	44500	15400
3	404	442	239	253	371	544	1670	5310	4160	7900	38500	12000
4	403	471	295	384	374	565	1590	4780	3840	6830	28800	10000
5	437	484	358	286	392	552	1510	4040	3710	5950	21600	9000
6	493	520	461	289	406	471	1490	3400	4390	5460	16500	8110
7	473	401	361	271	459	469	1470	3130	5540	5000	15000	7410
8	479	541	342	327	500	600	1350	2840	6440	4300	15900	6530
9	457	454	389	319	525	1330	1350	2780	5460	4010	16000	6200
10	438	471	413	309	554	1450	1340	3000	4560	3810	12600	6640
11	426	475	330	320	544	2510	1250	4150	4210	3800	9810	7030
12	434	462	280	320	520	3360	1300	4550	3700	4240	8640	6540
13	433	455	290	328	556	3930	1330	4140	3400	6700	8130	5870
14	438	474	270	280	356	4880	1430	4230	3460	5730	7520	5430
15	433	448	240	329	280	5700	1390	4400	3850	5110	6540	4840
16	450	501	230	328	355	6220	1360	5560	10300	4780	5760	4550
17	442	240	250	586	326	6650	1350	6440	19300	4260	5550	4230
18	480	140	260	634	381	6760	1310	5130	22400	3900	5450	4050
19	474	403	235	430	483	6650	1300	4820	23200	3730	5440	3950
20	446	422	220	426	496	6040	1400	6960	25500	4570	6550	3940
21	432	568	210	403	499	4990	1460	8750	23100	5700	9540	4030
22	430	446	210	398	514	4010	1450	9510	20200	6480	11400	3690
23	430	340	220	391	513	3510	1350	10500	21100	7260	12700	3700
24	425	308	260	398	454	2980	1380	10300	20500	7570	14900	3540
25	426	507	242	321	415	2720	1300	9970	18100	7600	19500	3390
26	382	469	205	350	397	2520	1450	9240	16200	6950	24100	3270
27	366	456	331	398	401	2240	1320	7880	14600	6330	25900	3170
28	393	466	292	377	427	2270	3240	7250	13300	7920	23200	3030
29	410	216	277	395	---	2070	5610	6470	14900	13100	25300	2940
30	450	305	276	406	---	1970	5190	5790	13100	20800	28500	2760
31	1280	---	284	359	---	1890	---	5100	---	33300	25600	---
TOTAL	14339	12298	8984	11169	12286	90877	52520	180160	341480	233020	543230	184740
MEAN	463	410	290	360	439	2932	1751	5812	11380	7517	17520	6158
MAX	1280	568	461	634	556	6760	5610	10500	25500	33300	44500	19500
MIN	366	140	205	253	280	469	1250	2780	3400	3730	5440	2760
AC-FT	28440	24390	17820	22150	24370	180300	104200	357300	677300	462200	1077000	366400
CFSM	.07	.06	.04	.06	.07	.45	.27	.89	1.75	1.15	2.69	.95
IN.	.08	.07	.05	.06	.07	.52	.30	1.03	1.95	1.33	3.10	1.06

CAL YR 1989	TOTAL 341443	MEAN 935	MAX 7070	MIN 140	AC-FT 677300	CFSM .14	IN. 1.95
WTR YR 1990	TOTAL 1685103	MEAN 4617	MAX 44500	MIN 140	AC-FT 3342000	CFSM .71	IN. 9.63

IOWA RIVER BASIN

05465000 CEDAR RIVER NEAR CONESVILLE, IA

LOCATION.--Lat 41°24'36", long 91°17'06", in SW1/4 SW1/4 sec.2, T.76 N., R.4 W., Muscatine County, Hydrologic Unit 07080206, on right bank 10 ft downstream from bridge on county highway G28, 3.4 mi northeast of Conesville, 5.2 mi downstream from Wapsinonoc Creek, 10.7 mi upstream from mouth, and at mile 39.8 upstream from mouth of Iowa River.

DRAINAGE AREA.--7,785 mi².

PERIOD OF RECORD.--September 1939 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1708: 1956.

GAGE.--Water-stage recorder. Datum of gage is 581.95 ft above NGVD. Prior to Feb. 2, 1940, and Apr. 11, 1952, to July 1, 1954, nonrecording gage, Feb. 2, 1940, to Apr. 10, 1952, and July 2, 1954, to Sept. 16, 1963, water-stage recorder, at site 150 ft downstream on left bank at same datum.

REMARKS.--Estimated daily discharges: Nov. 17-22, Nov. 29 to Dec. 5, Dec. 11 to Jan. 31, Feb. 15-23, and Feb. 27, 28. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--51 years, 4,701 ft³/s, 8.20 in/yr, 3,406,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 70,800 ft³/s Apr. 2, 1961, gage height, 16.62 ft; maximum gage height, 16.85 ft Apr. 12, 1965; minimum daily discharge, 250 ft³/s Nov. 28, 1955, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1929 reached a stage of 15.8 ft, from information by local residents to U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 12,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 26	0745	14,600	12.19	Aug. 18	0915	14,800	12.24
June 18	0545	*60,100	*16.87	Aug. 20	2015	14,300	12.12
Aug. 4	0815	37,300	15.20	Sept. 1	1815	25,700	14.09

Minimum discharge, 312 ft³/s Dec. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	686	774	440	370	677	780	2830	5470	7130	21000	20000	24800
2	669	1070	460	400	617	789	2760	5260	6620	16200	25200	23800
3	647	567	425	460	683	863	2620	5040	6260	12700	32500	19100
4	643	492	400	510	644	915	2530	5800	5970	10500	36200	14100
5	661	621	470	530	625	943	2440	7060	5650	9130	32500	11000
6	670	670	592	560	633	956	2290	7010	5410	8200	27800	9720
7	675	673	486	510	689	927	2210	5730	5800	7510	22800	8710
8	699	718	374	480	730	911	2170	4920	6840	6830	18000	7820
9	689	672	694	510	832	1060	2130	4530	8300	6170	16800	7200
10	681	743	642	500	893	1660	2100	4200	7910	5920	16900	6670
11	679	723	540	500	908	2740	2050	3980	6620	6210	15000	6540
12	658	685	450	520	919	3600	1990	4550	6060	6040	11600	7010
13	639	692	490	520	897	4730	1950	5900	5510	5770	10000	6690
14	644	701	460	500	849	5950	2000	6060	5890	8030	9080	6120
15	639	686	420	500	730	9330	2070	5660	5850	7510	8530	5730
16	626	694	400	520	640	10000	2060	5800	10300	6780	7580	5250
17	618	450	380	540	590	8440	2000	6430	40100	6310	8690	4930
18	620	345	420	600	620	8110	1970	8010	55000	5690	13600	4690
19	608	320	380	690	620	7950	1910	7170	39200	5200	7990	4500
20	628	370	360	780	740	7660	1930	6460	33400	5140	10700	4340
21	661	450	330	720	780	7290	1970	7330	30300	6060	11100	4380
22	636	560	320	660	840	6690	2000	9090	28400	7740	10500	4330
23	604	738	340	640	900	6250	2020	10100	27400	7460	12400	4160
24	615	665	370	600	979	5090	2010	10800	25800	8150	13300	3940
25	616	659	385	620	844	4450	1920	12400	24600	8490	15200	3890
26	604	554	380	630	791	4040	1900	14300	23300	8540	19100	3740
27	598	663	370	620	770	3690	1900	13400	21500	8210	22000	3610
28	595	743	360	580	770	3440	2050	10900	21000	7630	23500	3490
29	555	500	370	600	--	3190	2100	9770	22300	8860	24000	3370
30	598	400	390	580	--	3130	4120	8680	22700	12600	23000	3240
31	630	--	395	620	--	2990	--	7830	--	16700	23300	--
TOTAL	19791	18598	13293	17370	21210	128564	66000	229640	521120	267280	548870	226870
MEAN	638	620	429	560	757	4147	2200	7408	17370	8622	17710	7562
MAX	699	1070	694	780	979	10000	4120	14300	55000	21000	36200	24800
MIN	555	320	320	370	590	780	1900	3980	5410	5140	7580	3240
AC-FT	39260	36890	26370	34450	42070	255000	130900	455500	1034000	530100	1089000	450000
CFSM	.08	.08	.06	.07	.10	.53	.28	.95	2.23	1.11	2.27	.97
IN.	.09	.09	.06	.08	.10	.61	.32	1.10	2.49	1.28	2.62	1.08

CAL YR 1989	TOTAL	456797	MEAN	1251	MAX	6550	MIN	320	AC-FT	906100	CFSM	.16	IN.	2.18
WTR YR 1990	TOTAL	2078606	MEAN	5695	MAX	55000	MIN	320	AC-FT	4123000	CFSM	.73	IN.	9.93

05465500 IOWA RIVER AT WAPELLO, IA
(National stream-quality accounting network station)

LOCATION.--Lat 41°10'48", long 91°10'57", in NW1/4 SE1/4 sec.27, T.74 N., R.3 W., Louisa County, Hydrologic Unit 07080209, on right bank 30 ft downstream from bridge on State Highway 99 at east edge of Wapello, 13.0 mi downstream from Cedar River, and at mile 16.0.

DRAINAGE AREA.--12,499 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1914 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1917, 1923-30, 1932. WSP 1438: Drainage area. WSP 1558: 1918, 1923-25 (M), 1929. WSP 1708: 1955(P), 1956.

GAGE.--Water-stage recorder. Datum of gage is 538.17 ft above NGVD; Oct. 1, 1914 to Apr. 15, 1934, nonrecording gage and Apr. 16, 1934 to Sept. 30, 1972, water-stage recorder at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 18-20 and Nov. 30 to Jan. 18. Records good except those for estimated daily discharges, which are poor. Flow regulated by Coralville Lake (station 05453510) 67.3 mi upstream, since Sept. 17, 1958. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--76 years, 7,000 ft³/s, 7.60 in/yr, 5,072,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 94,000 ft³/s June 18, 1947, gage height, 16.14 ft, datum then in use; maximum gage height, 28.91 ft June 19, 1990; minimum daily discharge, 300 ft³/s Nov. 28, 1955, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 86,600 ft³/s, June 19, gage height, 28.91 ft; minimum daily discharge, 580 ft³/s Dec. 8, 23, 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1030	933	880	600	915	1190	5040	6510	14500	33200	25200	32500
2	990	1250	800	620	924	1120	4870	7190	13600	30400	26300	34200
3	975	1150	600	680	894	1150	4740	6940	13100	24700	31000	32900
4	956	801	680	740	921	1220	4510	7940	12600	21700	40800	27400
5	1010	749	800	760	890	1270	4140	13000	12000	19600	45800	21000
6	1050	910	900	780	897	1330	3890	14800	11600	18300	42800	18100
7	1030	924	660	770	951	1310	3730	11700	11500	17100	36300	16600
8	1020	937	580	750	1040	1320	3600	9420	12700	16300	30900	15400
9	1050	949	625	740	1120	1510	3520	8170	16900	15600	25700	14400
10	1010	899	725	720	1260	3670	3440	7390	16100	15300	24400	13800
11	989	1020	780	730	1300	9320	3380	6650	13000	16900	24200	13200
12	966	986	680	740	1320	10500	3330	6470	12500	17200	21400	13500
13	935	942	640	720	1270	11400	3310	8190	11800	16000	19700	13100
14	916	935	680	750	1470	13200	3330	11000	12500	17000	18200	11800
15	881	928	640	780	1150	21100	3410	10600	12500	17500	16900	11100
16	863	897	640	820	1200	22900	3630	10000	13500	16300	15800	10200
17	864	870	670	960	1280	18700	3540	10400	31300	15600	15200	9460
18	860	740	650	1200	1440	16100	3330	12000	69700	14500	20100	8760
19	884	630	640	1370	1420	15100	3310	12800	76000	13400	18500	8110
20	879	700	620	1500	1300	14100	3150	11300	76000	13100	16500	7390
21	905	736	620	1660	1270	12700	3140	11700	65100	13500	23400	7300
22	945	784	600	1400	1390	11500	3160	14100	52000	18300	23100	7040
23	917	859	580	1240	1430	10000	3160	15300	45400	16100	23600	6320
24	877	946	580	1130	1490	8840	3150	16400	42000	15700	23100	5860
25	871	907	600	1050	1450	7940	3070	20200	39500	16300	22900	5730
26	857	818	600	1060	1310	6770	2990	25400	37100	16300	26400	5590
27	835	759	620	1060	1290	6290	2970	24200	34700	16200	29200	5440
28	844	872	610	986	1350	6010	3120	21200	32900	16000	30000	5290
29	822	874	640	916	---	5660	3260	18000	31800	16600	32200	5150
30	818	745	620	986	---	5540	4130	16700	32900	21700	33300	4970
31	865	---	620	903	---	5210	---	15600	---	23500	32400	---
TOTAL	28714	26450	20580	29121	33942	253970	107350	391270	876800	559900	815300	391610
MEAN	926	882	664	939	1212	8193	3578	12620	29230	18060	26300	13050
MAX	1050	1250	900	1660	1490	22900	5040	25400	76000	33200	45800	34200
MIN	818	630	580	600	890	1120	2970	6470	11500	13100	15200	4970
AC-FT	56950	52460	40820	57760	67320	503700	212900	776100	1739000	1111000	1617000	776800

CAL YR 1989 TOTAL 667220 MEAN 1828 MAX 10900 MIN 580 AC-FT 1323000
WTR YR 1990 TOTAL 3535007 MEAN 9685 MAX 76000 MIN 580 AC-FT 7012000

IOWA RIVER BASIN

05465500 IOWA RIVER AT WAPELLO, IA--Continued
 (National stream-accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: January 1978 to current year.

WATER TEMPERATURES: January 1978 to current year.

SUSPENDED-SEDIMENT DISCHARGE: April 1978 to current year..

REMARKS.--During periods of ice effect samples are collected in open water channel or through ice cover. Records of specific conductance are obtained from suspended-sediment samples at time of analysis.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 920 microsiemens Dec. 17, 1988; minimum daily, 168 microsiemens June 21, 1990.

WATER TEMPERATURES: Maximum daily, 33.0°C July 25, 1987; minimum daily, 0.0°C on many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 4,970 mg/L June 25, 1981; minimum daily mean, 1 mg/L Jan. 21, 22, 1981.

SEDIMENT LOADS: Maximum daily, 604,000 tons June 20, 1990; minimum daily, 4.7 tons Dec. 23, 24, 1989.

EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,930 mg/L June 20; minimum daily mean, 3 mg/L Dec. 22-24, 29-31, Mar. 1.

SEDIMENT LOADS: Maximum daily, 604,000 tons June 20; minimum daily, 4.7 tons Dec. 23, 24.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
 INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	600	---	667	777	730	663	---	---	---	427	460	450
2	598	---	598	703	---	---	---	---	---	---	490	450
3	---	657	703	---	---	---	---	---	---	478	460	---
4	---	674	---	---	---	549	---	---	---	505	470	---
5	---	681	678	---	---	561	---	---	---	500	500	---
6	---	700	---	771	---	579	---	550	---	---	---	---
7	---	701	---	769	---	---	---	---	---	---	---	---
8	---	---	---	765	---	545	---	---	---	---	---	---
9	634	---	---	---	735	---	574	---	---	---	---	---
10	615	---	780	763	735	570	543	---	555	---	---	---
11	646	---	794	759	742	375	566	---	555	---	---	---
12	---	694	722	---	473	597	---	570	---	---	---	---
13	---	---	732	---	685	509	581	---	580	---	---	---
14	672	---	---	---	686	538	579	---	580	---	---	---
15	665	---	---	---	660	413	583	---	580	---	---	---
16	---	---	---	---	---	---	581	555	---	---	---	---
17	---	---	---	---	---	562	565	---	---	---	---	---
18	687	---	---	698	687	---	576	---	221	---	---	---
19	---	---	---	703	702	517	574	---	221	485	---	---
20	---	---	---	---	---	518	585	575	---	480	---	---
21	---	---	---	---	662	514	612	575	168	558	300	---
22	---	---	705	649	---	614	575	289	563	300	---	---
23	632	---	---	704	642	---	490	---	584	300	---	---
24	571	---	820	667	---	---	495	---	571	420	675	---
25	580	---	815	---	---	---	485	301	607	440	665	---
26	---	---	816	---	---	---	430	467	618	390	---	---
27	---	845	---	675	---	---	425	519	---	360	---	---
28	---	797	---	685	---	---	455	437	---	390	---	---
29	---	792	---	---	---	---	510	464	496	---	---	---
30	---	787	719	---	---	---	---	513	456	430	685	---
31	---	777	733	---	---	---	---	---	432	430	---	---

IOWA RIVER BASIN

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05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18.5	---	2.0	1.0	4.0	3.0	---	---	---	25.5	24.5	25.0
2	18.0	---	1.5	---	---	---	---	---	---	25.0	25.0	25.0
3	---	12.5	2.0	---	---	---	---	---	---	30.0	25.0	---
4	---	13.0	---	---	---	4.0	---	---	---	27.0	25.0	---
5	---	11.5	2.5	---	---	4.0	---	---	---	32.0	24.0	---
6	---	11.5	---	1.0	---	4.0	---	16.0	---	---	---	---
7	---	11.0	---	1.0	---	---	---	---	---	---	---	---
8	---	---	1.0	---	---	5.0	---	---	---	---	---	---
9	15.0	---	---	---	5.5	---	9.5	---	---	---	---	---
10	15.0	---	1.5	1.5	6.5	11.0	9.0	---	24.0	---	---	---
11	16.0	---	1.0	1.5	7.0	15.0	---	---	24.0	---	---	---
12	---	0.5	1.5	---	---	16.5	---	---	24.0	---	---	---
13	---	0.5	---	---	4.0	14.0	8.0	---	24.0	---	---	---
14	11.0	---	0.0	---	3.5	14.0	8.5	---	24.0	---	---	---
15	11.0	---	---	---	2.0	14.0	8.5	---	24.0	---	24.0	---
16	---	---	---	---	---	8.5	16.0	24.0	---	24.0	---	---
17	---	---	---	---	---	8.0	16.0	---	---	24.0	---	---
18	10.0	---	---	1.5	6.5	---	7.5	---	24.5	---	---	---
19	---	---	---	1.5	7.0	8.5	8.0	---	24.5	25.0	---	19.5
20	---	---	---	---	9.0	9.0	16.0	---	---	24.0	24.0	19.5
21	---	---	---	6.0	9.0	9.0	17.0	25.0	24.0	24.0	24.0	19.5
22	---	---	2.0	6.0	---	10.0	17.0	24.5	25.0	24.0	24.0	---
23	15.0	---	2.0	5.5	---	---	17.0	---	25.0	24.0	24.0	---
24	17.5	---	1.0	2.5	---	---	17.0	---	26.0	24.0	17.0	---
25	17.0	---	1.0	---	---	---	17.0	24.0	26.0	25.0	16.8	---
26	---	1.0	---	---	---	---	17.0	25.5	26.0	25.0	25.0	---
27	---	1.0	---	4.0	---	---	17.0	26.0	---	25.0	25.0	---
28	---	1.0	---	3.0	---	---	---	25.0	---	25.5	25.5	---
29	---	1.0	---	---	---	---	17.0	24.5	25.0	25.0	25.0	---
30	---	1.0	3.5	---	---	---	---	24.0	24.0	25.0	25.0	16.0
31	---	---	4.0	---	---	---	---	---	25.0	25.0	25.0	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD
	TRATION (MG/L)	(TONS/DAY)	TRATION (MG/L)	(TONS/DAY)	TRATION (MG/L)	(TONS/DAY)	TRATION (MG/L)	(TONS/DAY)	TRATION (MG/L)	(TONS/DAY)	TRATION (MG/L)	(TONS/DAY)
OCTOBER												MARCH
1	55	152	48	121	16	40	7	11	25	61	3	11
2	70	186	94	335	16	39	9	15	21	52	4	13
3	59	156	75	240	18	31	7	13	10	23	14	43
4	46	118	44	96	20	40	6	12	5	13	51	170
5	40	111	39	78	21	55	7	14	5	13	55	188
6	41	118	52	129	38	104	8	17	6	15	83	299
7	32	89	44	110	26	60	9	19	7	19	101	358
8	26	71	49	124	14	23	8	16	8	23	86	306
9	34	97	55	141	24	46	8	16	9	26	99	411
10	48	132	52	125	43	102	6	12	13	43	376	4980
11	76	202	55	152	58	125	5	9.9	55	193	1290	32900
12	60	156	54	144	15	28	7	14	55	195	992	27800
13	44	110	53	135	8	14	6	12	26	89	639	19600
14	34	83	52	132	12	22	5	10	26	102	662	24200
15	24	57	52	130	10	17	4	8.4	85	255	1760	102000
16	21	49	51	123	9	16	5	11	89	285	1270	78900
17	27	63	50	117	9	16	14	36	41	141	577	29500
18	25	57	47	94	8	14	26	84	21	81	312	13600
19	23	54	42	71	7	12	11	41	36	136	217	8820
20	21	50	36	68	6	10	24	97	37	131	224	8530
21	28	68	31	61	5	8.4	46	205	19	64	127	4420
22	67	171	27	58	3	4.9	43	163	17	62	77	2380
23	64	160	24	55	3	4.7	11	39	14	55	73	1970
24	41	97	21	53	3	4.7	11	33	28	113	68	1630
25	37	88	19	47	11	18	8	24	41	159	63	1340
26	36	83	18	40	10	16	5	14	37	130	59	1080
27	32	72	17	35	10	17	4	13	32	111	55	935
28	37	85	16	39	7	12	4	10	19	70	51	832
29	33	73	16	38	3	5.2	4	9.0	---	---	50	758
30	29	65	16	33	3	5.0	5	14	---	---	47	702
31	37	87	---	---	3	5.0	8	19	---	---	46	645
TOTAL	---	3160	---	3124	---	914.9	---	1011.3	---	2660	---	369321

IOWA RIVER BASIN

05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

IOWA RIVER BASIN

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05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-CHARGE, INST. TEMPER- ATURE WATER (DEG C) (00010)		SEDI-MENT, DIS-CHARGE, SUS-PENDED (MG/L) (80154)		SED. SUSP. FALL DIAM. .002 MM (70337)	SED. SUSP. FALL DIAM. .004 MM (70338)	SED. SUSP. FALL DIAM. .008 MM (70339)
		CUBIC FEET PER SECOND (00061)	SUS- PENDED (80154)	(T/DAY) (80155)				
NOV 14...	1215	12.0	937	51	129	--	--	--
DEC 12...	1440	0.0	1150	14	43	--	--	--
MAR 13...	1300	13.0	11200	599	18100	42	52	64
MAY 04...	1200	9.0	7780	109	2290	--	--	--
JUN 19...	1505	22.0	77100	938	180000	68	80	84
JUL 02...	1330	25.5	30800	402	33400	35	42	50
AUG 21...	1415	23.0	23900	1000	64500	42	52	62
DATE	TIME	SED. SUSP. % FINE THAN .016 MM (70340)	SED. SUSP. % FINE THAN .062 MM (70342)	SED. SUSP. % FINE THAN 125 MM (70343)	SED. SUSP. % FINE THAN 250 MM (70344)	SED. SUSP. % FINE THAN 500 MM (70345)	SED. SUSP. % FINE THAN 1.00 MM (70346)	SED. SUSP. % FINE THAN .062 MM (70331)
		FALL DIAM.	FALL DIAM.	FALL DIAM.	FALL DIAM.	FALL DIAM.	FALL DIAM.	SIEVE DIAM.
NOV 14...	--	--	--	--	--	--	--	100
DEC 12...	--	--	--	--	--	--	--	96
MAR 13...	78	88	88	93	99	100	--	
MAY 04...	--	88	96	100				
JUN 19...	86	88	88	89	95	100		
JUL 02...	56	65	65	76	94	100		
AUG 21...	76	97	98	99	100	--	--	

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED-MATERIAL, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	NUMBER OF SAM- PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINE THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINE THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINE THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINE THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINE THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINE THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINE THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINE THAN 8.00 MM (80171)
NOV 14...	1215	6	0	1	4	39	84	95	99	100
MAR 13...	1300	4	--	0	3	43	85	95	98	100
MAY 04...	1200	5	--	0	3	44	81	94	99	100
JUL 02...	1330	5	--	0	3	51	85	96	99	100
AUG 21...	1415	5	--	0	7	63	94	98	100	--

IOWA RIVER BASIN
05465500 IOWA RIVER AT WAPELLO, IA--Continued
WATER QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-	SPE-	PH	TEMPER-	TEMPER-	TUR-	OXYGEN,	BARO-	COLI-
		CHARGE, INST. CUBIC FEET PER SECOND	CIFIC CON- DUCT- ANCE (US/CM)	(STAND- ARD UNITS)	ATURE WATER (DEG C)	ATURE AIR (DEG C)	BID- ITY (NTU)	DIS- OLVED (00076)	(PER- CENT (MG/L)	METRIC PRES- SURE (MM)
NOV 14...	1215	937	585	9.4	12.0	12.5	15	13.8	132	743 350
DEC 12...	1440	1150	700	9.1	0.0	-15.0	4.5	15.1	105	752 K7
MAR 13...	1300	11200	500	8.0	13.0	21.5	120	9.8	95	745 2000
MAY 04...	1200	7780	532	8.2	13.5	9.0	32	9.4	92	745 410
JUL 02...	1330	30800	460	8.1	25.5	23.0	80	6.4	80	748 K160000
AUG 21...	1415	23900	305	8.4	23.0	23.0	250	5.8	69	753 K140000
STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL DIS- SOLVED (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKALI- NITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
NOV 14...	280	190	43	21	47	34	1	4.7	157	32 127
DEC 12...	22	250	56	26	54	32	1	5.1	195	18 202
MAR 13...	K11000	200	51	18	15	13	0.5	7.6	132	0 161
MAY 04...	<460	230	61	19	14	11	0.4	3.7	143	0 175
JUL 02...	K9300	200	57	15	7.3	7	0.2	4.1	133	0 163
AUG 21...	K120000	130	36	10	5.4	8	0.2	4.6	105	0 128
SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L AC-FT) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NO2+N03 DIS- SOLVED (MG/L AS N) (00605)	NITRO- GEN, NO2+N03 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, NO2+N03 DIS- SOLVED (MG/L AS N) (00613)
NOV 14...	53	64	0.30	0.11	335	329	0.46	848	2.2	0.250 0.020
DEC 12...	63	76	0.30	0.06	411	404	0.56	1280	2.4	1.20 0.020
MAR 13...	38	30	0.30	8.3	333	288	0.45	10100	2.9	8.80 0.110
MAY 04...	45	30	0.50	7.5	333	307	0.45	6990	1.3	8.90 0.100
JUL 02...	25	22	0.20	12	272	268	0.37	22600	1.1	10.0 0.160
AUG 21...	19	8.4	1.2	8.8	202	173	0.27	13000	1.4	3.60 0.060

K Results based on colony count outside ideal range.

IOWA RIVER BASIN

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05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	NITRO-GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO-GEN, AM- MONIA + AMMONIA TOTAL (MG/L AS N) (00610)	PHOS- PHORUS ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, CHARGE, SUS- PENDED (MG/L) (80155)	SED- IMENT, DIS- PENDED (T/DAY) (70331)	SED- IMENT, SIEVE, % FINER THAN .062 MM (70342)	SED- IMENT, SUSP., % FINER THAN .062 MM (01000)	ARSENIC DIAM. DIAM. DIAM. DIAM. DIAM. DIAM. DIAM. DIAM. DIAM. DIAM.
	NOV 14... DEC 12... MAR 13... MAY 04... JUL 02... AUG 21...	0.010 0.470 0.420 0.420 0.070 0.020 0.080 0.080	0.020 0.420 2.8 3.4 0.120 0.150 0.160 0.160	2.2 0.250 0.260 0.140 0.130 0.180 0.160 0.160	0.120 0.260 0.260 0.160 0.130 0.170 0.200 0.200	0.160 0.590 0.590 0.320 0.290 0.290 0.280 0.280	0.520 14 599 18100 109 402 1000 1000	51 43 18100 2290 33400 64500 -- --	129 96 100 88 2290 33400 64500 97	-- -- -- 88 88 65 97	2 -- -- 2 1 -- 2	
DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)		
NOV 14... DEC 12... MAR 13... MAY C4... JUL 02... AUG 21...	10 -- -- 20 10 -- 70	73 -- -- 160 110 -- 80	<0.5 -- -- <0.5 <0.5 -- <0.5	<1.0 -- -- <1.0 <1.0 -- <1.0	<1 -- -- <5 2 -- 1	<3 -- -- <3 <3 -- <3	2 -- -- <10 3 -- 5	34 -- -- 39 15 -- 42	<1 -- -- <10 <1 -- 1	8 -- -- 5 6 -- 4		
DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01175)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	ATRA- ZINE, TOTAL (UG/L) (39630)		
NOV 14... DEC 12... MAR 13... MAY 04... JUL 02... AUG 21...	19 -- -- 16 4 -- 3	<0.1 -- -- 0.1 <0.1 -- <0.1	<10 -- -- <10 <10 -- <10	2 -- -- <1 3 -- 2	<1 -- -- <1 1 -- <1	<1.0 -- -- <1.0 <1.0 -- <1.0	170 -- -- 150 150 -- 85	<6 -- -- <6 <6 -- <6	20 -- -- 22 7 -- 3	0.32 -- -- 1.1 0.56 -- 1.0		
DATE	CYAN- AZINE TOTAL (UG/L)	METRI- BUZIN IN WHOLE WATER (UG/L)	ALA- CHLOR IN TOTAL RECOVER (UG/L)	METOLA- CHLOR IN WHOLE WATER (UG/L)	TRI- FLURA- LIN IN TOTAL RECOVER (UG/L)	ETHO- PROP TOTAL (UG/L)	DYFO- NATE TOTAL (UG/L)	PHORATE TOTAL (UG/L)	TERBU- FOS (UG/L)			
	[Pesticide concentration expressed as total recoverable] (81757)	(81408)	(77825)	(39356)	(39030)	(99901)	(81758)	(81294)	(39023)	(82088)		
NOV 14... DEC 12... MAR 13... MAY 04... JUL 02... AUG 21...	<0.10 -- -- 0.19 0.42 -- <0.10	<0.10 -- -- <0.10 <0.10 -- <0.10	<0.10 -- -- <0.10 <0.10 -- <0.10	<0.10 -- -- <0.10 <0.10 -- <0.10	<0.10 -- -- <0.10 <0.10 -- <0.10	<0.10 -- -- <0.10 <0.10 -- <0.10	-- -- -- -- -- -- --	-- -- -- -- -- -- --	-- -- -- -- -- -- --	-- -- -- -- -- -- --		

SKUNK RIVER BASIN

05470000 SOUTH SKUNK RIVER NEAR AMES, IA

LOCATION.--Lat 42°04'05", long 93°37'02", in NW1/4 SW1/4 sec.23, T.84 N., R.24 W., Story County, Hydrologic Unit 07080105, on left bank 2.5 mi north of Ames, 3.5 mi downstream from Keigley Branch, 5.2 mi upstream from Squaw Creek, and at mile 228.1 upstream from mouth of Skunk River.

DRAINAGE AREA.--315 mi².

PERIOD OF RECORD.--July 1920 to September 1927, October 1932 to current year. Monthly discharge only for some periods, published in WSP 1308. Prior to October 1966, published as Skunk River near Ames.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1308: 1921, 1925-26, 1934-35 (M), 1937 (M), 1939 (M), 1947-50 (M). WDR Iowa 1967: 1965. WDR IA-74-1: 1973 (P).

GAGE.--Water-stage recorder. Concrete control since July 21, 1934. Datum of gage is 893.61 ft above NGVD (Iowa Highway Commission benchmark). Prior to Aug. 25, 1921, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 12 to Jan. 6, and Jan. 31 to Feb. 4. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--65 years (water years 1921-27, 1933-90), 163 ft³/s, 7.03 in/yr, 118,100 acre-ft/yr; median of yearly mean discharges, 130 ft³/s, 5.6 in/yr, 94,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,630 ft³/s June 10, 1954, gage height, 13.66 ft; maximum gage height, 13.90 ft May 20, 1944; no flow at times in 1934, 1937, 1953-57, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 20	1615	3,250	7.37	June 23	0845	2,890	6.97
May 25	1245	2,120	5.97	July 27	2330	2,600	6.45
June 17	2300	*6,600	*11.84	July 29	1645	3,540	7.55
June 20	1100	4,630	9.36				

Minimum discharge, 0.18 ft³/s Oct. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.7	22	7.6	2.5	5.3	8.7	83	128	398	605	838	161
2	1.4	27	6.9	3.6	5.2	10	79	112	355	527	648	136
3	.99	26	6.4	3.5	5.2	11	71	103	347	458	557	124
4	.67	24	6.6	3.3	5.4	11	69	103	351	389	467	110
5	.51	22	6.8	3.5	5.9	11	70	98	332	585	379	96
6	.43	20	7.6	3.4	6.0	11	65	90	331	439	316	83
7	1.1	18	7.0	3.6	5.9	19	61	83	307	363	274	74
8	1.9	17	7.8	4.5	6.4	244	58	81	307	313	237	70
9	3.8	16	7.7	5.2	7.1	603	59	645	313	256	205	67
10	4.1	15	7.7	5.5	7.4	324	65	840	292	257	404	67
11	3.0	15	6.8	5.0	8.0	270	67	544	258	330	285	58
12	2.8	14	6.0	4.8	8.8	561	71	404	233	876	217	52
13	2.9	13	5.6	4.8	9.2	406	74	343	348	847	192	48
14	2.7	12	4.0	5.0	7.9	525	77	296	1150	601	190	44
15	3.0	11	3.8	4.9	8.1	898	79	259	1050	505	185	41
16	4.0	11	3.5	5.0	8.7	820	80	252	1980	407	178	38
17	3.3	9.4	3.2	5.8	8.4	552	80	210	5200	334	174	36
18	12	8.3	2.7	6.1	8.1	394	75	177	5130	289	169	45
19	18	9.2	2.3	5.8	7.5	294	74	1990	3210	316	218	59
20	15	9.3	2.2	6.4	6.9	234	79	2940	4230	911	443	58
21	13	8.7	1.8	6.0	6.8	201	77	2020	2510	567	189	55
22	12	11	1.7	5.9	7.5	183	73	1270	2310	410	161	50
23	11	8.6	1.6	6.0	7.9	163	73	1250	2820	327	145	46
24	9.3	9.5	1.7	6.1	7.7	143	73	1430	1980	276	157	44
25	8.6	9.8	1.9	6.0	7.6	127	70	1930	1610	238	604	43
26	8.1	8.9	1.8	6.2	8.1	116	66	1760	1290	329	747	39
27	7.5	11	2.1	6.2	8.2	104	72	1210	1090	1480	430	36
28	8.8	8.5	2.5	6.0	8.1	99	93	929	956	2010	313	35
29	10	8.5	2.4	5.9	--	94	130	724	862	3200	243	33
30	16	8.1	2.2	5.6	--	90	146	577	713	1980	226	32
31	20	--	2.6	6.0	--	86	--	471	--	1140	204	--
TOTAL	207.60	411.8	134.5	158.1	203.3	7612.7	2309	23269	42263	21565	9995	1880
MEAN	6.70	13.7	4.34	5.10	7.26	246	77.0	751	1409	696	322	62.7
MAX	20	27	7.8	6.4	9.2	898	146	2940	5200	3200	838	161
MIN	.43	8.1	1.6	2.5	5.2	8.7	58	81	233	238	145	32
AC-FT	412	817	267	314	403	15100	4580	46150	83830	42770	19830	3730
CFSM	.02	.04	.01	.02	.02	.78	.24	2.38	4.47	2.21	1.02	.20
IN.	.02	.05	.02	.02	.02	.90	.27	2.75	4.99	2.55	1.18	.22

CAL YR 1989 TOTAL 7068.54 MEAN 19.4 MAX 503 MIN .43 AC-FT 14020 CFSM .06 IN. .83
WTR YR 1990 TOTAL 110009.00 MEAN 301 MAX 5200 MIN .43 AC-FT 218200 CFSM .96 IN. 12.99

SKUNK RIVER BASIN

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05470500 SQUAW CREEK AT AMES, IA

LOCATION.--Lat $42^{\circ}01'21''$, long $93^{\circ}37'45''$, in NE1/4 NW1/4 sec. 10, T. 83 N., R. 24 W., Story County, Hydrologic Unit 07080105, on left bank 65 ft downstream from Lincoln Way Bridge in Ames, 0.2 mi, downstream from College Creek, and 2.4 mi, upstream from mouth.

DRAINAGE AREA.--204 mi².

PERIOD OF RECORD.--May 1919 to September 1927, May 1965 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: Drainage area, 1920-22 (M), 1923, 1924-25 (M), 1926, 1927 (M), WDR Iowa, 1966: 1965, WDR IA-71-1: 1970 (M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 881.00 ft above NGVD (levels by Iowa State University). Prior to Mar. 11, 1925, nonrecording gage at site 0.6 mi upstream at different datum. Mar. 11, 1925 to Apr. 30, 1927, nonrecording gage at site 65 ft upstream at datum about 4 ft higher.

REMARKS.--Estimated daily discharges: Dec. 19 to Jan. 2, and Feb. 15-19. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--33 years (water years 1920-27, 1966-90), 129 ft³/s, 8.59 in/yr, 93,460 acre-ft/yr; median of yearly mean discharges, 100 ft³/s, 6.7 in/yr, 72,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,500 ft³/s June 17, 1990, gage height, 15.97 ft, from floodmark; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 4, 1918, reached a stage of 14.5 ft, from floodmarks, site and datum used 1919-25, discharge, 6,900 ft³/s. Flood of Mar. 1, 1965, reached a stage of 10.7 ft, from graph based on gage readings, at present site and datum, discharge, 4,200 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 9	1315	1,620	5.56	June 17	unknown	*12,500	(a)*15.97
May 19	1930	4,200	10.61	June 10	0545	2,590	8.28
May 25	1415	3,420	9.62				

(a) from floodmark

Minimum daily discharge, 16 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.25	5.5	12	.20	2.3	1.9	27	61	406	410	215	47
2	.25	7.4	12	.19	1.8	3.1	23	66	356	344	236	44
3	.32	6.2	8.6	.25	2.5	3.6	21	80	349	298	225	40
4	.30	5.7	11	.57	2.7	3.8	21	101	297	257	213	35
5	3.0	5.3	13	.47	2.7	5.6	21	104	266	562	165	30
6	.50	5.3	14	.46	2.9	4.0	17	109	230	372	139	26
7	.51	4.8	11	.37	2.7	42	16	118	206	294	121	22
8	.45	4.7	11	.43	3.8	502	19	148	200	251	107	24
9	.42	5.1	11	.52	3.6	470	24	1140	198	240	97	21
10	.34	4.0	11	.39	3.7	205	25	810	182	290	393	18
11	.39	4.4	8.6	.43	4.7	204	22	579	171	386	148	16
12	.34	3.6	6.2	.49	4.9	251	21	514	163	721	109	14
13	.43	4.3	6.1	.56	5.8	195	28	473	466	665	94	13
14	.47	5.3	5.0	.50	2.4	450	31	384	848	535	77	10
15	.51	7.9	2.5	.49	2.3	607	33	345	950	479	62	8.5
16	2.2	8.5	.93	.59	2.2	492	32	328	1650	334	48	7.6
17	.33	8.2	.69	10	2.1	258	29	258	6270	278	39	7.2
18	.32	8.1	.50	.99	2.0	140	26	232	3360	252	28	25
19	.40	8.0	.30	1.0	1.9	79	31	2820	2100	389	72	19
20	.44	11	.26	.95	1.8	62	24	2720	2100	413	334	15
21	.39	11	.20	1.1	2.4	58	22	1320	1300	389	101	12
22	.39	13	.18	1.6	2.9	61	20	1030	1480	311	79	10
23	.54	9.3	.16	4.3	2.6	40	26	1250	1270	291	71	7.5
24	1.2	10	.18	2.2	2.5	32	29	1620	931	289	126	6.7
25	2.6	12	.19	1.7	1.9	29	33	2990	780	301	335	6.6
26	3.6	11	.17	2.5	2.3	23	49	1900	664	306	236	7.6
27	5.2	15	.18	1.7	2.7	23	70	1170	564	260	137	7.3
28	6.2	11	.19	1.4	1.8	24	60	892	638	249	100	7.2
29	6.5	11	.20	1.7	---	26	59	720	592	273	77	6.2
30	28	10	.21	2.0	---	25	60	574	502	305	65	7.1
31	7.4	---	.20	1.6	---	25	---	480	---	254	56	---
TOTAL	74.19	236.6	147.74	41.65	77.9	4345.0	919	25336	29489	10998	4305	520.5
MEAN	2.39	7.89	4.77	1.34	2.78	140	30.6	817	983	355	139	17.3
MAX	2.8	.15	14	10	5.8	607	70	2990	6270	721	393	47
MIN	.25	3.6	.16	.19	1.8	1.9	16	61	163	240	28	6.2
AC-FT	147	469	293	83	155	8620	1820	50250	58490	21810	8540	1030
CFSM	.01	.04	.02	.01	.01	.69	.15	4.01	4.82	1.74	.68	.09
IN.	.01	.04	.03	.01	.01	.79	.17	4.62	5.38	2.01	.79	.09

CAL YR 1989 TOTAL 8625.28 MEAN 23.6 MAX 1350 MIN .02 AC-FT 17110 CFSM .12 IN. 1.57
WTR YR 1990 TOTAL 76490.58 MEAN 210 MAX 6270 MIN .16 AC-FT 151700 CFSM 1.03 IN. 13.95

SKUNK RIVER BASIN

05471050 SOUTH SKUNK RIVER AT COLFAX, IA

LOCATION.--Lat $41^{\circ}40'55''$, long $93^{\circ}14'47''$, in NE1/4 NE1/4 SW1/4 sec.1, T.79 N., R.21 W., Jasper County, Hydrologic Unit 07080105, on left bank 15 ft downstream of bridge on State Highway 117 at north edge of Colfax, 1 mi downstream from Sugar Creek, 2.8 mi upstream from Indian Creek, and at mile 191 upstream from mouth of Skunk River.

WATER-DISCHARGE RECORDS

DRAINAGE AREA.--803 mi².

PERIOD OF RECORD.--October 1985 to current year.

GAGE.--Water-stage recorder. Datum of gage is 770.00 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 17-19, Nov. 27 to Mar. 8, July 28 to Aug. 2, Aug. 6-9, and Sept. 4, 5. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--5 years, 522 ft³/s, 8.83 in/yr, 378,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,770 ft³/s June 20, 1990, gage height, 19.07 ft, from floodmark; minimum discharge, 1.2 ft³/s Aug. 18, 19, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood occurred in late June, 1975, discharge and gage height not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 13	1500	3,030	13.68	July 12	2400	3,690	15.10
May 21	1630	5,750	16.61	July 19	2015	3,830	15.33
May 26	1330	6,350	17.03	July 28	unknown	unknown	unknown
June 20	unknown	*8,770	(a)*19.07				

(a) from floodmark

Minimum daily discharge, 12 ft³/s Dec. 24, 25.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	56	16	16	19	15	339	466	1360	1800	1940	409
2	24	46	14	15	18	14	314	421	1200	1570	1590	370
3	22	46	15	15	17	15	290	384	1100	1390	1550	342
4	23	51	17	15	16	14	269	404	1050	1220	1350	306
5	31	53	19	14	16	15	252	423	1000	1470	1180	278
6	34	50	16	14	17	17	240	393	948	1590	996	247
7	27	48	17	14	18	25	225	362	893	1240	878	230
8	25	48	22	14	17	600	219	335	941	1070	796	223
9	25	45	31	14	18	1210	211	374	877	956	701	210
10	25	42	41	15	20	1280	219	1760	840	941	907	199
11	23	42	35	16	19	968	211	1410	789	1240	1080	192
12	23	40	30	15	18	868	207	1110	745	2440	813	181
13	22	40	24	14	17	2110	217	1010	766	3470	667	168
14	23	39	19	13	16	2500	233	921	1370	2530	590	159
15	24	37	17	14	16	2420	229	825	1750	2050	531	152
16	27	30	16	15	15	2270	218	1150	3370	1640	486	145
17	27	33	15	30	14	1800	208	1050	6290	1350	461	140
18	22	36	15	40	13	1330	199	846	7190	1160	430	148
19	23	41	14	35	14	1030	199	1490	8050	1720	389	168
20	23	46	14	30	14	865	223	4220	8510	2990	712	177
21	24	39	14	26	15	764	220	5260	8320	2230	806	174
22	28	36	13	24	16	679	211	3570	7630	1650	568	164
23	28	28	13	23	15	600	205	2720	6310	1320	483	154
24	27	34	12	25	16	539	200	3210	5430	1120	432	145
25	26	40	12	28	15	492	194	4880	4230	986	636	142
26	25	35	13	26	16	459	185	6120	3380	1040	1170	138
27	24	30	14	24	15	428	295	4590	2790	2140	1020	134
28	26	23	15	23	14	410	629	2960	2570	3340	726	130
29	28	21	17	22	--	404	577	2340	2400	3590	581	122
30	36	18	18	21	--	378	498	1900	2080	3580	503	122
31	40	--	17	20	--	357	--	1580	--	2580	448	--
TOTAL	810	1173	565	630	454	24876	7936	58484	94179	57413	25420	5869
MEAN	26.1	39.1	18.2	20.3	16.2	802	265	1887	3139	1852	820	196
MAX	40	56	41	40	20	2500	629	6120	8510	3590	1940	409
MIN	22	18	12	13	13	14	185	335	745	941	389	122
AC-FT	1610	2330	1120	1250	901	49340	15740	116000	186800	113900	50420	11640
CFSM	.03	.05	.02	.03	.02	1.00	.33	2.35	3.91	2.31	1.02	.24
IN.	.04	.05	.03	.03	.02	1.15	.37	2.71	4.36	2.66	1.18	.27
CAL YR 1989	TOTAL	26692.4	MEAN	73.1	MAX	1650	MIN	6.6	AC-FT	52940	CFSM	.09
WTR YR 1990	TOTAL	277809	MEAN	761	MAX	8510	MIN	12	AC-FT	551000	CFSM	.95
										IN.	12.87	

SKUNK RIVER BASIN

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05471050 SOUTH SKUNK RIVER AT COLFAX, IA--Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1988 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1988 to current year.

WATER TEMPERATURES: October 1988 to current year.

SUSPENDED-SEDIMENT DISCHARGE: October 1988 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis. Miscellaneous records of specific conductance, water temperature, and suspended-sediment discharge from May 13 to September 30, 1988 on file at the District Office in Iowa City.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 1051 microsiemens Dec. 15, 1989; minimum daily, 255 microsiemens Mar. 11, 1989.

WATER TEMPERATURES: Maximum daily, 31.0°C July 7, 1989; minimum daily, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,480 mg/L Mar. 14, 1990; minimum daily mean, 2 mg/L Jan. 28, 1990.

SEDIMENT LOADS: Maximum daily, 21,000 tons June 17, 1990; minimum daily, 0.05 ton Jan. 7, 8, 1989.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 1051 microsiemens Dec. 15; minimum daily, 265 microsiemens June 18.

WATER TEMPERATURES: 27.0°C, Aug. 28.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,480 mg/L Mar. 14; minimum daily mean, 2 mg/L Jan. 28.

SEDIMENT LOADS: Maximum daily, 21,000 tons June 17; minimum daily, 0.11 ton Feb. 18.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	863	797	699	702	729	724	735	707	701	719
2	---	---	816	832	712	692	716	752	645	742	674	644
3	---	---	888	822	747	685	683	733	650	---	713	701
4	---	---	885	---	725	707	676	721	670	661	543	532
5	---	---	797	818	712	720	701	540	---	721	743	683
6	---	---	720	705	645	712	703	700	650	642	564	---
7	---	---	762	742	651	727	702	620	705	775	541	631
8	---	---	752	775	652	311	622	680	735	599	613	717
9	---	---	801	761	629	379	635	680	695	776	775	751
10	---	---	832	749	647	453	680	---	675	634	647	673
11	---	---	832	752	644	438	689	640	680	630	605	795
12	---	---	976	739	659	528	713	720	700	593	714	770
13	---	---	979	764	627	573	726	740	635	478	558	702
14	---	---	992	761	693	466	665	680	745	635	578	732
15	---	---	1051	777	711	576	687	750	570	731	816	794
16	---	---	904	756	720	624	713	750	365	644	549	760
17	---	---	908	509	780	682	684	700	350	---	698	778
18	---	---	804	934	584	---	671	702	705	265	797	745
19	---	---	814	913	618	792	749	694	700	---	720	572
20	---	---	760	899	661	781	762	656	---	355	454	708
21	---	742	890	618	745	751	679	453	345	572	461	756
22	---	741	---	742	704	746	682	556	435	676	710	792
23	---	814	---	708	691	---	691	600	445	633	557	780
24	---	830	---	604	---	769	708	540	445	591	653	660
25	---	767	---	668	---	743	701	460	510	648	725	643
26	---	685	827	668	758	697	705	425	---	---	666	680
27	---	732	797	692	740	664	644	430	549	578	674	---
28	---	727	830	825	723	667	627	535	---	475	636	765
29	---	805	803	740	---	692	640	640	620	576	785	775
30	---	866	787	720	---	655	684	670	685	463	668	816
31	---	---	800	765	---	715	---	705	---	612	689	---

SKUNK RIVER BASIN

05471050 SOUTH SKUNK RIVER AT COLFAX, IA--Continued
WATER-QUALITY RECORDSWATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	2.0	1.0	3.0	3.0	8.0	12.0	18.0	25.0	22.0	26.0
2	---	---	3.0	3.0	3.0	3.0	10.0	13.0	19.0	24.0	22.0	25.0
3	---	---	2.0	--	3.0	3.0	9.0	15.0	18.0	--	23.0	26.0
4	---	---	2.0	--	2.0	3.0	10.0	13.0	15.0	26.0	23.0	26.0
5	---	---	3.0	3.0	3.0	3.0	13.0	13.0	--	25.0	22.0	25.0
6	---	---	3.0	1.0	3.0	3.0	9.0	14.0	17.0	24.0	20.0	--
7	---	---	2.0	2.0	3.0	3.0	7.0	16.0	18.0	24.0	20.0	25.0
8	---	---	1.0	2.0	3.0	4.0	10.0	19.0	18.0	26.0	20.0	24.0
9	---	---	1.0	3.0	3.0	3.0	13.0	19.0	18.0	25.0	21.0	25.0
10	---	---	2.0	2.0	3.0	4.0	12.0	--	20.0	25.0	21.0	24.0
11	---	---	1.0	2.0	3.0	6.0	9.0	22.0	23.0	21.0	21.0	--
12	---	---	1.0	2.0	3.0	11.0	6.0	20.0	24.0	20.0	22.0	24.0
13	---	---	1.0	2.0	3.0	13.0	10.0	19.0	25.0	19.0	20.0	23.0
14	---	---	1.0	1.0	3.0	13.0	9.0	17.0	24.0	20.0	21.0	20.0
15	---	---	1.0	2.0	3.0	10.0	10.0	17.0	22.0	19.0	21.0	19.0
16	---	---	1.0	3.0	3.0	8.0	12.0	19.0	21.0	21.0	23.0	18.0
17	---	---	1.0	3.0	2.0	11.0	9.0	15.0	22.0	--	23.0	15.0
18	---	---	.0	1.0	2.0	--	15.0	10.0	16.0	22.0	25.0	18.0
19	---	---	2.0	1.0	2.0	3.0	--	12.0	18.0	--	26.0	19.0
20	---	---	3.0	1.0	3.0	3.0	7.0	14.0	16.0	24.0	24.0	16.0
21	---	1.0	1.0	3.0	3.0	9.0	14.0	14.0	25.0	23.0	23.0	17.0
22	---	3.0	--	3.0	3.0	10.0	--	14.0	21.0	21.0	22.0	16.0
23	---	2.0	--	3.0	3.0	--	18.0	15.0	22.0	21.0	22.0	17.0
24	---	3.0	--	3.0	3.0	--	10.0	20.0	17.0	21.0	22.0	23.0
25	---	--	--	3.0	--	10.0	20.0	16.0	24.0	21.0	23.0	--
26	---	2.0	1.0	3.0	3.0	7.0	21.0	17.0	26.0	--	23.0	16.0
27	---	2.0	2.0	3.0	3.0	9.0	20.0	15.0	24.0	21.0	26.0	18.0
28	---	2.0	2.0	2.0	3.0	9.0	16.0	17.0	--	--	27.0	17.0
29	---	3.0	2.0	3.0	--	9.0	14.0	18.0	25.0	25.0	26.0	18.0
30	---	2.0	2.0	3.0	--	10.0	11.0	18.0	25.0	24.0	24.0	16.0
31	---	--	--	2.0	2.0	--	8.0	--	18.0	--	22.0	23.0

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)
OCTOBER												
NOVEMBER												
1	17	1.1	12	1.9	4	.19	6	.27	7	.35	5	.19
2	13	.84	10	1.3	6	.23	4	.17	6	.30	6	.22
3	11	.65	10	1.2	7	.28	4	.16	3	.15	5	.21
4	9	.57	9	1.3	4	.20	4	.15	4	.18	4	.15
5	13	1.2	8	1.2	5	.25	4	.15	5	.21	4	.18
6	12	1.1	8	1.1	7	.28	4	.14	7	.33	5	.23
7	8	.63	7	.96	4	.19	4	.13	6	.28	23	1.6
8	7	.46	7	.88	3	.21	5	.17	5	.24	382	620
9	6	.40	6	.77	4	.31	6	.22	7	.32	407	1460
10	5	.36	6	.71	3	.38	7	.29	4	.21	406	1450
11	5	.31	6	.70	8	.73	5	.23	5	.24	130	341
12	5	.29	6	.66	8	.61	13	.52	5	.22	123	293
13	5	.27	6	.64	9	.55	7	.26	5	.22	1500	10700
14	4	.27	5	.57	9	.46	8	.30	8	.36	2480	16900
15	4	.27	5	.49	9	.42	8	.28	7	.29	1220	7940
16	8	.61	4	.37	8	.34	13	.52	4	.16	474	2940
17	9	.64	4	.37	10	.39	17	1.4	4	.13	275	1350
18	8	.46	5	.47	10	.42	8	.88	3	.11	186	670
19	7	.40	5	.57	9	.35	6	.53	5	.17	148	414
20	6	.34	10	1.3	10	.36	5	.42	5	.18	100	235
21	5	.36	4	.46	10	.36	9	.64	3	.12	65	135
22	8	.61	5	.50	10	.34	11	.69	5	.22	69	127
23	7	.49	7	.50	10	.34	7	.45	5	.20	56	91
24	6	.40	6	.56	10	.32	12	.81	4	.19	39	57
25	5	.37	6	.65	9	.29	7	.55	4	.17	33	43
26	5	.32	6	.54	8	.28	13	.92	7	.29	55	68
27	4	.29	4	.36	8	.29	7	.46	8	.31	68	79
28	5	.37	10	.62	5	.22	2	.13	5	.18	83	92
29	5	.37	9	.52	3	.12	3	.18	--	--	58	63
30	7	.66	4	.21	3	.15	5	.28	--	--	41	41
31	7	.86	--	--	3	.14	6	.32	--	--	38	36
TOTAL	--	16.27	--	22.38	--	10.00	--	12.62	--	6.33	--	46147.78

SKUNK RIVER BASIN

05471050 SOUTH SKUNK RIVER AT COLFAX, IA--Continued

WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

SKUNK RIVER BASIN
05471050 SOUTH SKUNK RIVER AT COLFAX, IA--Continued
WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	CUBIC FEET PER SECOND (00061)	DIS- CHARGE, INST.	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. % FINER THAN .002 MM (70337)	SED. SUSP. % FINER THAN .004 MM (70338)
OCT 11...	0915	11.5	24	5	0.32	--	--	--
NOV 16...	1220	--	40	6	0.65	--	--	--
MAR 08...	1230	2.0	463	577	721	--	--	--
	1400	13.0	2780	2860	21500	52	61	
	0935	6.0	404	74	81	--	--	
MAY 10...	1030	11.5	1910	1650	8510	58	72	
	1040	12.0	5310	748	10700	49	55	
JUL 26...	1000	20.0	205	891	493	--	--	
SEP 27...	0945	--	132	27	9.6	--	--	
				SED. SUSP. % FINER THAN .008 MM (70339)	SED. SUSP. % FINER THAN .016 MM (70340)	SED. SUSP. % FINER THAN .062 MM (70342)	SED. SUSP. % FINER THAN .125 MM (70343)	SED. SUSP. % FINER THAN .250 MM (70344)
OCT 11...	--	--	--	--	--	--	--	93
NOV 13...	--	--	--	--	--	--	--	90
MAR 08...	--	--	--	--	--	--	--	95
	72	85	98	98	100	--	--	--
	--	--	--	--	--	--	--	57
MAY 10...	86	93	98	98	100	--	--	
	61	65	77	81	92	100	--	
JUL 26...	--	--	--	--	--	--	--	59
SEP 27...	--	--	--	--	--	--	--	75

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED-MATERIAL, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	NUMBER OF SAM- PLING POINTS (COUNT) (00063)	BED MAT. % FINER THAN .062 MM (80164)	BED MAT. % FINER THAN .125 MM (80165)	BED MAT. % FINER THAN .250 MM (80166)	BED MAT. % FINER THAN .500 MM (80167)	BED MAT. % FINER THAN .1.00 MM (80168)	BED MAT. % FINER THAN .2.00 MM (80169)	BED MAT. % FINER THAN .4.00 MM (80170)	BED MAT. % FINER THAN .8.00 MM (80171)	BED MAT. % FINER THAN .16.0 MM (80172)	BED MAT. % FINER THAN .32.0 MM (80173)
OCT 11...	0919	5	0	1	8	70	96	100	--	--	--	--
NOV 16...	1220	5	--	0	10	76	96	99	100	--	--	--
MAR 29...	0935	5	1	1	6	69	86	89	91	93	99	100
JUL 26...	0915	5	1	3	12	84	98	100	--	--	--	--
SEP 27...	1003	5	0	1	5	55	91	97	99	100	--	--

SKUNK RIVER BASIN

127

05471200 INDIAN CREEK NEAR MINGO, IA

LOCATION.--Lat 41°48'17", long 93°18'36", in NW1/4 NW1/4 secs. 28, T.81 N., R.21 W., Jasper County, Hydrologic Unit 07080105, on right bank 30 ft downstream from bridge on State Highway 117, 0.7 mi downstream from Wolf Creek, 2.2 mi upstream from Byers Branch, 2.9 mi northwest of Mingo, and 11.3 mi upstream from S. Skunk River.

DRAINAGE AREA.--276 mi².

PERIOD OF RECORD.--May 1958 to September 1975; October 1985 to current year.

REVISED RECORDS.--WSP 1728: 1958 (M), 1959 (M).

GAGE.--Water-stage recorder. Datum of gage is 810.47 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 17-20, Nov. 29 to Mar. 8, and July 29. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--22 years (water years 1959-75, 1986-90), 190 ft³/s, 9.35 in/yr, 137,700 acre-ft/yr; median of yearly mean discharges, 170 ft³/s, 8.4 in/yr, 123,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,380 ft³/s June 12, 1966, gage height, 16.41 ft; no flow part of each day Aug. 13, 16-19, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 20, 1944, reached a stage of 21.4 ft, from information by local resident, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 13	0930	3,420	13.10	June 23	0700	2,610	11.67
May 16	0600	1,760	10.27	July 13	1515	4,680	14.69
May 20	0700	2,460	11.58	July 19	2130	3,660	13.52
May 25	1315	3,940	13.89	July 28	1245	*6,980	*16.34
June 16	1345	3,250	12.86	Aug. 20	2345	1,720	9.81
June 18	1745	6,550	16.11				

Minimum daily discharge 0.71 ft³/s, Oct. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.0	18	2.4	1.7	2.7	4.8	66	232	398	567	1060	171
2	.85	11	2.1	1.7	3.3	4.6	60	184	366	490	871	141
3	.71	8.5	2.3	1.6	3.6	4.5	54	153	326	428	869	125
4	.83	9.2	2.6	1.6	3.8	4.4	54	146	281	368	679	113
5	5.2	7.4	3.0	1.5	4.3	4.6	50	132	268	651	551	99
6	3.1	6.2	2.6	1.5	4.5	5.0	44	107	258	699	457	90
7	1.7	6.2	2.8	1.5	4.8	7.0	41	85	243	463	397	79
8	1.6	6.2	3.2	1.5	5.2	800	42	66	256	378	350	75
9	1.6	5.9	3.5	1.5	5.4	732	41	220	246	332	304	70
10	1.4	5.3	3.2	1.7	5.6	388	42	854	234	352	385	63
11	1.3	5.3	3.0	1.7	6.0	364	38	425	227	710	666	56
12	5.9	9.7	2.6	1.6	6.6	309	35	333	242	2380	458	50
13	2.5	5.2	2.2	1.5	7.0	1750	37	321	321	4410	346	46
14	2.4	4.8	1.9	1.4	6.2	1600	39	286	293	2070	286	41
15	2.5	4.4	1.7	1.5	5.4	1040	40	245	329	1240	251	38
16	4.6	3.1	1.6	2.5	5.0	657	37	1330	2090	942	224	34
17	3.1	3.2	1.6	3.5	4.5	467	34	712	4500	743	208	31
18	2.2	3.3	1.5	3.0	4.2	348	30	444	5810	607	186	37
19	2.7	3.4	1.5	2.8	4.4	264	32	1340	4180	1330	165	44
20	5.0	3.7	1.5	2.6	4.6	217	42	2010	3880	2430	723	41
21	4.1	3.8	1.4	2.4	4.7	193	41	972	2000	1330	989	41
22	3.6	3.9	1.4	2.3	5.0	167	38	692	2120	891	529	37
23	3.6	4.1	1.3	2.5	4.7	133	37	789	2340	675	399	32
24	3.5	4.8	1.3	3.0	5.0	115	35	2290	1440	545	332	30
25	3.3	4.5	1.3	3.3	4.8	103	33	3630	1190	458	442	28
26	3.5	4.1	1.4	3.0	5.0	92	31	2160	1040	432	499	30
27	3.4	5.9	1.5	2.8	4.8	80	108	1220	965	2490	371	31
28	6.3	4.3	1.7	2.6	4.6	75	473	892	851	6090	285	29
29	5.3	3.8	1.9	2.5	---	74	449	688	806	4720	234	27
30	8.4	2.8	1.8	2.4	---	71	314	548	663	2130	219	27
31	13	--	1.8	2.3	---	68	---	457	---	1370	211	--
TOTAL	108.19	172.0	63.6	67.0	135.7	10141.9	2417	23963	38163	42721	13946	1756
MEAN	3.49	5.73	2.05	2.16	4.85	327	80.6	773	1272	1378	450	58.5
MAX	13	18	3.5	3.5	7.0	1750	473	3630	5810	6090	1060	171
MIN	.71	2.8	1.3	1.4	2.7	4.4	30	66	227	332	165	27
AC-FT	215	341	126	133	269	20120	4790	47530	75700	84740	27660	3480
CFSM	.01	.02	.01	.01	.02	1.19	.29	2.80	4.61	4.99	1.63	.21
IN.	.01	.02	.01	.01	.02	1.37	.33	3.23	5.14	5.76	1.88	.24

CAL YR 1989	TOTAL	4423.52	MEAN	12.1	MAX	556	MIN	.01	AC-FT	8770	CFSM	.04	IN.	.60
WTR YR 1990	TOTAL	133654.39	MEAN	366	MAX	6090	MIN	.71	AC-FT	265100	CFSM	1.33	IN.	18.01

SKUNK RIVER BASIN

05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IA

LOCATION.--Lat 41°21'19", long 92°39'31", in NW1/4 SW1/4 sec.25, T.76 N., R.16 W., Mahaska County, Hydrologic Unit 07080105, on right bank 400 ft upstream from bridge on U.S. Highway 63, 0.3 mi downstream from Painter Creek, 4.0 mi north of Oskaloosa, 52.0 mi upstream from confluence with North Skunk River, and at mile 147.3 upstream from mouth of Skunk River.

DRAINAGE AREA.--1,635 mi².

PERIOD OF RECORD.--October 1945 to current year. Prior to October 1966, published as Skunk River near Oskaloosa. Prior to October 1948, monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 685.50 ft above NGVD. Prior to Nov. 21, 1947, nonrecording gage at site 400 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 5-11, 13-18, Nov. 27 to Jan. 18, Jan. 23, 25-27, Jan. 30 to Mar. 9, Mar. 13-25, Apr. 7-12, and Sept. 8-10. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--45 years, 961 ft³/s, 7.98 in/yr, 696,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft³/s June 15, 1947, gage height, 21.26 ft, from floodmarks; maximum gage height, 23.05 ft June 23, 1990; minimum daily discharge, 1.8 ft³/s Oct. 11-13, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May 1944 reached a stage of 25.8 ft, from floodmarks, discharge, 37,000 ft³/s, from rating curve extended above 18,000 ft³/s on basis of velocity-area study.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 15	unknown	unknown	unknown	July 15	1015	6,430	18.41
May 21	unknown	6,260	(a)17.61	July 22	0045	6,830	18.74
May 27	2015	9,040	20.25	July 31	2030	8,170	19.71
June 23	0200	*15,200	*23.05				

(a) from floodmark

Minimum daily discharge, 15 ft³/s Dec. 23-27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	67	94	47	24	170	44	774	1270	2780	5310	7850	867
2	63	81	44	21	160	42	731	1100	2440	4370	6150	776
3	59	85	37	20	150	40	690	1090	2170	3650	4410	705
4	57	84	31	19	135	40	667	1130	1940	3170	3760	653
5	66	89	27	18	125	42	637	1160	1800	3150	2930	604
6	101	88	23	17	140	46	594	1040	1700	3460	2390	564
7	84	88	21	16	165	48	562	938	1590	3100	2060	530
8	72	79	20	17	150	165	538	862	1990	2490	1850	515
9	63	72	53	18	130	890	524	824	1780	2110	1650	511
10	62	66	46	18	115	1890	504	1050	1530	2280	1570	470
11	60	61	43	19	105	2480	487	2680	1420	2370	1960	437
12	60	55	41	20	100	1790	471	2340	1330	3350	2250	416
13	58	57	29	18	97	1840	492	2030	1280	5110	1670	402
14	56	61	22	17	97	5360	539	1790	1390	5930	1400	382
15	57	65	17	19	105	6500	527	1650	2080	6230	1230	360
16	57	68	17	29	120	5080	507	1670	4150	4930	1110	346
17	63	74	17	55	100	3920	489	2990	9770	3630	1040	329
18	70	80	17	600	89	3080	468	2170	11100	2810	959	325
19	64	88	18	332	76	2460	462	1800	11800	2390	878	340
20	55	78	18	265	67	2070	486	3790	13100	4980	1030	345
21	55	71	17	241	61	1790	512	6120	13700	6250	1670	350
22	56	77	16	224	59	1680	489	6070	14100	6510	1800	338
23	56	67	15	210	55	1440	473	4670	14900	4570	1310	318
24	55	101	15	236	51	1230	462	4430	13600	3230	1300	306
25	55	67	15	275	55	1130	459	7190	12300	2490	1400	298
26	57	66	15	250	51	979	453	8510	11000	2220	1420	289
27	55	59	15	235	48	900	490	8910	9910	5040	1880	278
28	55	55	16	220	46	855	1260	8510	8830	5510	1520	270
29	60	52	20	208	--	862	1900	6620	7780	6850	1230	258
30	80	49	24	195	--	846	1580	4530	6510	7540	1190	249
31	100	--	28	185	--	807	--	3390	--	8020	981	--
TOTAL	1978	2177	784	4041	2822	50346	19227	102324	189770	133050	63848	12831
MEAN	63.8	72.6	25.3	130	101	1624	641	3301	6326	4292	2060	428
MAX	101	101	53	600	170	6500	1900	8910	14900	8020	7850	867
MIN	55	49	15	16	46	40	453	824	1280	2110	878	249
AC-FT	3920	4320	1560	8020	5600	99860	38140	203000	376400	263900	126600	25450
CFSM	.04	.04	.02	.08	.06	.99	.39	2.02	3.87	2.63	1.26	.26
IN.	.05	.05	.02	.09	.06	1.15	.44	2.33	4.32	3.03	1.45	.29

CAL YR 1989 TOTAL 52196 MEAN 143 MAX 2690 MIN 15 AC-FT 103500 CFSM .09 IN. 1.19
WTR YR 1990 TOTAL 583198 MEAN 1598 MAX 14900 MIN 15 AC-FT 1157000 CFSM .98 IN. 13.27

SKUNK RIVER BASIN

129

05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IA

LOCATION.--Lat 41°18'03", long 92°12'16", in NE1/4 SE1/4 sec.14, T.75 N., R.12 W., Keokuk County, Hydrologic Unit 07080106, on right bank 20 ft downstream from bridge on State Highway 149, 1.2 mi downstream from Cedar Creek, 2.2 mi south of Sigourney, 4.0 mi upstream from Bridge Creek, and 16.2 mi upstream from confluence with South Skunk River.

DRAINAGE AREA.--730 mi².

PERIOD OF RECORD.--October 1945 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1946-47 (M).

GAGE.--Water-stage recorder. Datum of gage is 651.53 ft above NGVD. Prior to June 10, 1953, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 19 to Mar. 7, Aug. 4-6, and Sept. 9, 10. Records good except those estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--45 years, 445 ft³/s, 8.28 in/yr, 322,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,500 ft³/s Mar. 31, 1960, gage height, 25.33 ft; minimum daily discharge, 0.1 ft³/s Oct. 7 to Nov. 15, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May 1944 reached a stage of 22.8 ft, from floodmark, discharge, 14,500 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,800 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 28	1845	3,990	17.17	July 31	0200	4,810	18.49
June 20	0915	*21,300	*25.18				

Minimum daily discharge, 11 ft³/s Dec. 21-24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	57	95	24	15	67	40	396	579	899	1010	2640	356
2	55	104	21	16	65	45	375	481	813	839	1070	288
3	50	83	19	17	63	45	347	424	740	770	906	260
4	47	71	20	17	62	49	325	900	650	686	1130	250
5	50	67	22	16	66	54	311	1820	586	615	1390	235
6	52	63	21	15	68	54	288	1040	555	650	847	215
7	75	58	17	17	71	70	263	762	533	631	658	196
8	76	58	16	19	94	104	249	616	545	546	585	196
9	57	53	18	22	129	1490	247	539	1650	486	520	328
10	49	50	17	25	136	2400	251	503	1000	466	473	295
11	45	49	15	22	118	2760	247	485	683	844	532	214
12	43	47	14	19	95	2640	236	504	580	1290	610	177
13	41	45	13	19	81	1670	227	1010	524	1010	609	161
14	43	45	12	20	70	2000	244	865	610	879	512	184
15	42	44	12	28	56	3060	271	664	507	689	423	144
16	40	42	12	39	52	3080	269	701	1090	569	395	129
17	38	41	12	45	43	3230	248	911	3730	489	378	120
18	37	29	12	96	45	1700	235	927	4810	429	408	120
19	46	23	12	270	52	1100	227	690	10700	396	363	119
20	47	28	12	200	45	902	230	655	15600	494	854	128
21	45	33	11	139	48	796	243	715	9990	1790	1160	175
22	38	35	11	116	43	721	258	584	6590	1680	617	135
23	36	33	11	108	41	640	257	562	5650	869	421	118
24	34	32	11	107	39	552	244	695	4630	630	535	108
25	32	30	12	109	37	488	236	2740	3870	502	2370	101
26	33	29	12	140	40	458	223	3570	3320	429	1230	100
27	31	31	12	160	39	417	217	3280	1760	480	763	101
28	32	30	13	100	42	388	310	3780	1270	2460	480	97
29	34	27	14	96	---	391	594	3420	1120	3240	409	93
30	40	23	14	78	---	415	769	1440	1040	3880	436	89
31	52	---	15	73	---	417	---	1040	---	4480	406	---
TOTAL	1397	1398	457	2163	1807	32176	8837	36902	86045	34228	24130	5242
MEAN	45.1	46.6	14.7	69.8	84.5	1038	295	1190	2868	1104	778	175
MAX	76	104	24	270	136	3230	769	3780	15600	4480	2640	356
MIN	31	23	11	15	37	40	217	424	507	396	363	89
AC-FT	2770	2770	906	4290	3580	63820	17530	73200	170700	67890	47860	10400
CFSM	.06	.06	.02	.10	.09	1.42	.40	1.63	3.93	1.51	1.07	.24
IN.	.07	.07	.02	.11	.09	1.54	.45	1.88	4.38	1.74	1.23	.27

CAL YR 1989 TOTAL 36331.8 MEAN 99.5 MAX 2820 MIN 8.0 AC-FT 72060 CFSM .14 IN. 1.85
WTR YR 1990 TOTAL 234782 MEAN 643 MAX 15600 MIN 11 AC-FT 465700 CFSM .88 IN. 11.96

SKUNK RIVER BASIN

05473400 CEDAR CREEK NEAR OAKLAND MILLS, IA

LOCATION.--Lat. 40°55'20", long 91°40'10", in SE1/4 NW1/4 sec.28, T.71 N., R.7 W., Henry County, Hydrologic Unit 07080107, on left bank 30 ft upstream from bridge on county highway H46, 3.0 mi west of Oakland Mills, 2.9 mi upstream from Wolf Creek, and 4.3 mi upstream from mouth.

DRAINAGE AREA.--530 mi².

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1957 to 1977. July 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 565.07 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 17-19, and Nov. 28 to Mar. 1. Records good except those for estimated daily discharges, which are poor. Occasional high-water measurements were made by U.S. Army Corps of Engineers in 1965, 1966, 1970, and 1974 and by U.S. Geological Survey in 1966 and 1967. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--13 years, 358 ft³/s, 9.17 in/yr, 259,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,560 ft³/s Apr. 3, 1983, gage height, 19.68 ft; minimum daily discharge, 0.42 ft³/s Sept. 17, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 22, 1973 reached a stage of 24.09 ft, discharge not determined. Flood of June 1905 reached a stage approximately 2 feet higher from information by local resident.

EXTREMES FOR CURRENT PERIOD.--Peak discharges greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 12	1030	4,270	14.19	June 20	1115	*7,530	*18.54
Mar. 15	1130	5,140	15.71	June 22	1230	6,530	17.75
May 5	2215	3,180	11.92	July 21	1245	4,790	15.13
May 26	1515	5,100	15.63	July 30	0645	3,300	12.18

Minimum daily discharge, 3.2 ft³/s Dec. 22, 23.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	28	5.8	7.0	13	40	128	200	815	929	636	74
2	11	19	5.2	6.6	15	46	124	144	556	606	586	45
3	11	19	4.7	7.6	16	44	112	117	377	383	643	161
4	10	16	5.0	8.0	19	41	100	596	215	256	563	92
5	16	13	6.0	12	22	40	94	2450	149	183	718	50
6	19	11	5.4	16	25	41	94	1900	162	132	362	33
7	22	11	4.7	21	22	45	83	799	191	103	198	27
8	18	10	4.4	16	28	232	73	515	767	89	136	23
9	17	12	4.5	13	26	399	73	373	433	80	108	21
10	16	15	4.7	12	24	784	80	306	150	85	93	20
11	12	11	3.8	14	28	3570	86	266	95	97	79	19
12	11	9.6	3.5	15	25	3740	81	216	74	262	103	19
13	8.6	7.5	3.4	13	20	1500	73	320	65	844	200	18
14	6.3	8.6	3.4	13	17	2390	85	592	561	354	582	16
15	5.6	10	3.4	14	16	4970	116	375	676	196	202	14
16	7.4	8.1	3.5	15	14	2880	111	294	587	139	123	13
17	12	6.4	3.6	18	16	1080	93	380	5150	91	97	12
18	9.3	5.8	3.3	21	18	681	84	278	6180	81	85	12
19	8.3	6.5	3.4	27	17	498	74	198	6230	786	84	12
20	15	8.3	3.4	23	15	373	67	176	6920	2390	69	12
21	11	7.5	3.3	20	24	306	70	174	5030	4440	59	15
22	9.3	7.1	3.2	21	45	281	78	142	6250	4300	52	14
23	8.2	7.5	3.2	23	84	248	78	130	5690	2440	50	14
24	8.1	7.8	3.7	21	110	198	73	139	4290	646	48	21
25	8.4	7.5	4.5	18	86	162	71	2770	3400	392	44	22
26	9.2	7.4	4.2	15	62	157	67	5060	2960	268	348	17
27	7.1	7.5	5.0	15	45	144	63	4880	2610	408	149	14
28	11	6.6	5.6	16	38	128	68	1710	2270	2080	83	12
29	12	5.6	6.1	17	---	124	282	979	1810	2830	61	12
30	12	6.1	6.9	18	---	134	308	787	1310	2740	57	11
31	13	--	6.4	25	---	138	---	800	--	921	74	--
TOTAL	356.8	306.4	137.2	501.2	890	25414	2989	28066	65973	29551	6692	845
MEAN	11.5	10.2	4.43	16.2	31.8	820	99.6	905	2199	953	216	28.2
MAX	22	28	6.9	27	110	4970	308	5060	6920	4440	718	161
MIN	5.6	5.6	3.2	6.6	13	40	63	117	65	80	44	11
AC-FT	708	608	272	994	1770	50410	5930	55670	130900	58610	13270	1680
CFSM	.02	.02	.01	.03	.06	1.55	.19	1.71	4.15	1.80	.41	.05
IN.	.03	.02	.01	.04	.06	1.78	.21	1.97	4.63	2.07	.47	.06

CAL YR 1989 TOTAL 26592.8 MEAN 72.9 MAX 3420 MIN 3.2 AC-FT 52750 CFSM .14 IN. 1.87
WTR YR 1990 TOTAL 161721.6 MEAN 443 MAX 6920 MIN 3.2 AC-FT 320800 CFSM .84 IN. 11.35

SKUNK RIVER BASIN

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05474000 SKUNK RIVER AT AUGUSTA, IA
 (National stream-quality accounting network station)

LOCATION.--Lat $40^{\circ}45'13''$, long $91^{\circ}16'40''$, in NE1/4 NE1/4 sec.26, T.69 N., R.4 W., Des Moines County, Hydrologic Unit 07080107, on left bank 300 ft upstream from bridge on State Highway 394 at Augusta, 2.0 mi upstream from Long Creek, and at mile 12.5.

DRAINAGE AREA.--4,303 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September to November 1913, October 1914 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1915 (M), 1919-27 (M), 1932-34 (M), 1936, 1937-38 (M), 1942 (M). WSP 1438: Drainage area. WDR IA-71-1: 1966 (M).

GAGE.--Water-stage recorder. Datum of gage is 521.24 ft above NGVD. Prior to Nov. 15, 1913, nonrecording gage at site 400 ft upstream at datum about 0.7 ft higher. May 27, 1915, to Jan. 14, 1935, nonrecording gage at site 400 ft upstream at present datum.

REMARKS.--Estimated daily discharges: Dec. 12 to Jan. 7 and Jan. 27 to Feb. 7. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--76 years (water years 1915-90), 2,445 ft³/s, 7.72 in/yr, 1,771,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 66,800 ft³/s Apr. 23, 1973, gage height, 27.05 ft; minimum daily discharge, 7 ft³/s Aug. 27 to Sept. 1, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1, 1903, reached a stage of about 21 ft, discharge, about 45,000 ft³/s. Stage and discharge for flood of April 1973 are believed to be the greatest since 1851.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 15,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 11	2300	16,700	13.98	June 23	0900	*44,200	*22.34
Mar. 15	0745	21,600	16.15	July 21	2230	15,700	13.48
May 26	1345	16,600	13.93				

Minimum daily discharge, 61 ft³/s Dec. 23, 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	232	159	125	62	280	635	1870	2320	12300	14000	11100	2500
2	219	160	114	64	250	631	1820	2800	11700	12600	11000	2310
3	200	162	90	68	240	576	1720	2390	9870	11400	11400	3140
4	186	164	111	80	240	476	1620	4250	7410	10300	11400	2790
5	181	217	99	100	260	476	1490	8060	5540	8960	10600	1970
6	226	235	108	120	300	476	1400	10800	4430	7650	9930	1620
7	230	202	94	165	330	451	1310	7440	4080	6690	8690	1390
8	196	189	88	189	390	565	1220	4760	4240	6090	6830	1240
9	192	435	86	209	474	1320	1160	3730	4060	5670	5530	1140
10	185	210	99	193	525	1890	1160	3110	3720	5440	4500	1060
11	216	171	71	176	560	12300	1130	2680	4420	5240	3890	1090
12	206	172	86	155	560	15700	1090	2460	3550	5930	3500	1090
13	183	172	80	152	563	12300	1050	3150	3000	7050	3790	1000
14	170	171	77	154	559	10400	1110	4720	3530	6860	4760	902
15	159	168	76	153	501	20500	1110	4820	4100	5720	4160	821
16	156	133	75	160	208	16100	1120	4070	5240	5490	3280	775
17	160	68	74	188	231	12000	1140	3660	16100	5390	2920	729
18	155	65	70	212	292	10100	1100	3570	21300	5710	3260	704
19	149	128	68	199	345	8930	1040	4040	20300	6700	2660	681
20	141	136	67	240	302	7820	1000	4180	26000	10900	2270	651
21	137	139	66	249	282	6270	977	3520	28000	13000	2210	645
22	139	134	64	347	336	4710	976	3510	37500	13500	2730	659
23	143	127	61	603	789	4000	989	4510	43300	11900	2800	742
24	149	121	61	563	1240	3460	1010	4750	37600	8320	2870	754
25	149	129	66	329	1150	3000	1000	9440	30900	7180	2530	664
26	149	135	63	223	818	2670	972	16200	26100	7390	4830	619
27	141	139	65	270	725	2380	950	15800	23100	7640	5430	573
28	140	141	64	240	715	2180	956	14400	20800	8770	3830	552
29	139	123	63	240	---	2030	1010	12200	18500	10600	3190	529
30	147	118	62	260	---	1920	1460	11900	15900	11800	3070	509
31	152	---	62	290	---	1880	---	12000	---	11600	2770	---
TOTAL	5327	4823	2455	6653	13465	168146	35960	195240	456590	265490	161730	33849
MEAN	172	161	79.2	215	481	5424	1199	6298	15220	8564	5217	1128
MAX	232	435	125	603	1240	20500	1870	16200	43300	14000	11400	3140
MIN	137	65	61	62	208	451	950	2320	3000	5240	2210	509
AC-FT	10570	9570	4870	13200	26710	333500	71330	387300	905600	526600	320800	67140
CFSM	.04	.04	.02	.05	.11	1.26	.28	1.46	3.54	1.99	1.21	.26
IN.	.05	.04	.02	.06	.12	1.45	.31	1.69	3.95	2.30	1.40	.29

CAL YR 1989 TOTAL 177674 MEAN 487 MAX 10500 MIN 61 AC-FT 352400 CFSM .11 IN. 1.54
 WTR YR 1990 TOTAL 1349728 MEAN 3698 MAX 43300 MIN 61 AC-FT 2677000 CFSM .86 IN. 11.67

SKUNK RIVER BASIN

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

LOCATION.--Samples collected at bridge on State Highway 394, 300 ft downstream from gage.

PERIOD OF RECORD.--Water years 1975 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1975 to current year.

WATER TEMPERATURES: October 1975 to current year.

SUSPENDED-SEDIMENT DISCHARGE: October 1975 to current year.

REMARKS.--During periods of ice effect, sediment samples are collected in open water channel. Records of specific conductance are obtained from suspended sediment samples at time of analysis.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 950 microsiemens Dec. 20, 1979, Feb. 12, 1980; minimum daily, 180 microsiemens Aug. 17, 1986.

WATER TEMPERATURES: Maximum daily, 34.0°C July 20, 1980, Aug. 15-17, 1988, July 10-13, 1989; minimum daily, daily, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 8,550 mg/L June 25, 1981; minimum daily mean, 1 mg/L Mar. 8, 9, 12, 1978, Jan. 5, 6, 1984.

SEDIMENT LOADS: Maximum daily, 499,000 tons Mar. 21, 1978; minimum daily, 1.4 tons Dec. 11, 1989.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 916 microsiemens Jan. 7; minimum daily, 215 microsiemens APR. 22.

TEMPERATURES: Maximum daily, 30.0°C July 4, 8, and 9; minimum daily, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 4,640 mg/L June 17; minimum daily mean, 6 mg/L Feb. 15.

SEDIMENT LOADS: Maximum daily, 219,000 tons June 22; minimum daily, 2.8 tons Jan. 4.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	426	673	574	735	493	621	655	594	498	525	334	621
2	412	710	572	825	513	640	638	559	565	558	352	649
3	444	693	694	790	556	650	638	568	601	528	397	661
4	478	674	685	771	633	663	569	483	636	516	430	547
5	523	697	696	720	654	657	634	506	650	561	506	579
6	525	697	672	894	660	661	647	423	668	583	498	618
7	568	698	624	916	650	677	627	500	688	491	502	659
8	547	696	678	825	670	631	630	559	675	602	575	704
9	570	685	707	650	609	599	629	614	624	592	624	689
10	547	594	641	644	652	534	634	623	606	579	634	565
11	554	632	580	691	622	341	641	638	585	600	655	463
12	573	616	717	--	618	334	655	637	546	543	647	480
13	594	634	688	591	618	403	650	656	615	543	668	530
14	593	612	716	677	607	457	632	563	575	422	568	509
15	601	580	699	757	605	331	633	589	537	476	490	508
16	598	550	665	702	583	395	532	574	437	431	518	458
17	595	603	748	660	607	381	547	655	319	497	625	487
18	600	635	758	673	544	429	559	667	259	504	598	479
19	565	667	777	620	549	480	531	668	267	566	576	545
20	596	660	640	604	567	551	530	500	242	368	663	548
21	540	666	636	580	543	587	538	537	215	383	612	513
22	572	625	651	667	540	350	552	647	247	429	561	521
23	564	634	676	649	587	617	538	663	247	317	550	529
24	608	644	678	650	570	619	536	462	233	412	520	545
25	583	652	683	550	577	617	520	457	277	482	606	537
26	608	655	715	545	552	621	488	388	320	537	394	543
27	624	652	740	507	588	637	506	393	365	465	274	491
28	630	653	721	484	599	568	511	411	396	538	368	528
29	619	685	751	522	--	512	511	416	439	498	523	508
30	655	599	753	509	--	646	547	405	496	295	618	516
31	677	--	751	488	--	641	--	453	--	322	592	--

SKUNK RIVER BASIN
05474000 SKUNK RIVER AT AUGUSTA, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22.0	12.0	3.0	1.0	3.0	6.0	11.0	17.0	24.0	27.0	25.0	28.0
2	19.0	12.0	3.0	2.0	3.0	8.0	10.0	18.0	22.0	27.0	25.0	27.0
3	18.0	10.0	1.0	2.0	4.0	6.0	10.0	14.0	19.0	28.0	25.0	28.0
4	18.0	12.0	3.0	2.0	4.0	8.0	12.0	12.0	20.0	30.0	26.0	28.0
5	15.0	13.0	5.0	2.0	5.0	7.0	10.0	13.0	19.0	29.0	25.0	28.0
6	16.0	10.0	4.0	2.0	5.0	7.0	10.0	13.0	19.0	28.0	24.0	29.0
7	15.0	12.0	2.0	2.0	5.0	4.0	11.0	18.0	19.0	29.0	25.0	28.0
8	17.0	12.0	.0	2.0	9.0	7.0	13.0	19.0	19.0	30.0	25.0	28.0
9	16.0	10.0	2.0	2.0	7.0	10.0	12.0	17.0	21.0	30.0	24.0	27.0
10	17.0	10.0	2.0	3.0	6.0	11.0	10.0	16.0	---	27.0	26.0	27.0
11	19.0	12.0	.0	3.0	7.0	14.0	10.0	18.0	22.0	25.0	26.0	27.0
12	20.0	10.0	.0	12.0	8.0	14.0	11.0	15.0	25.0	22.0	24.0	27.0
13	21.0	17.0	.0	2.0	6.0	17.0	10.0	17.0	25.0	21.0	24.0	28.0
14	22.0	14.0	.0	3.0	1.0	14.0	13.0	18.0	25.0	21.0	24.0	26.0
15	23.0	9.0	.0	4.0	1.0	12.0	15.0	17.0	25.0	23.0	25.0	25.0
16	16.0	4.0	.0	4.0	2.0	12.0	15.0	18.0	24.0	28.0	25.0	25.0
17	12.0	4.0	.0	2.0	2.0	11.0	14.0	18.0	24.0	25.0	26.0	25.0
18	12.0	3.0	.0	2.0	4.0	9.0	14.0	20.0	25.0	24.0	27.0	19.0
19	12.0	8.0	.0	2.0	4.0	8.0	13.0	20.0	25.0	26.0	27.0	19.0
20	10.0	9.0	.0	2.0	4.0	8.0	14.0	19.0	23.0	24.0	27.0	20.0
21	10.0	6.0	.0	2.0	5.0	8.0	14.0	19.0	23.0	23.0	25.0	20.0
22	14.0	4.0	.0	3.0	4.0	7.0	18.0	19.0	21.5	24.0	25.0	20.0
23	16.0	4.0	.0	3.0	4.0	6.0	21.0	16.0	23.0	25.0	25.0	18.0
24	18.0	5.0	.0	5.0	1.0	6.0	22.0	17.0	24.0	24.0	27.0	19.0
25	20.0	6.0	.0	5.0	1.0	9.0	24.0	16.0	24.0	25.0	27.0	21.0
26	20.0	7.0	.0	1.0	4.0	9.0	24.0	16.0	25.0	25.0	27.0	21.0
27	18.0	11.0	.0	1.0	5.0	10.0	21.0	19.0	27.0	25.0	28.0	22.0
28	18.0	4.0	.0	2.0	5.0	9.0	18.0	18.0	27.0	25.0	28.0	23.0
29	16.0	2.0	.0	3.0	--	8.0	20.0	19.0	27.0	25.0	28.0	21.0
30	15.0	3.0	.0	3.0	--	8.0	17.0	20.0	26.0	25.0	28.0	20.0
31	13.0	--	.0	3.0	--	8.0	--	20.0	--	25.0	27.0	--

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)											
OCTOBER												
1	35	22	17	7.2	10	3.5	50	8.4	59	45	21	36
2	44	26	13	5.7	12	3.6	31	5.4	50	34	11	19
3	36	20	18	7.7	13	3.0	25	4.6	19	12	9	13
4	28	14	16	7.2	17	5.4	13	2.8	17	11	12	15
5	24	12	21	13	19	5.0	11	3.0	19	13	10	13
6	37	23	28	17	30	8.7	9	2.9	14	11	7	9.5
7	40	25	18	9.8	24	6.3	10	4.5	16	14	8	10
8	32	17	15	7.5	41	11	11	5.6	19	20	25	42
9	28	14	41	58	43	10	12	6.8	35	46	118	442
10	26	13	33	19	50	13	12	6.3	29	41	1350	10600
11	39	23	29	13	62	12	15	7.1	32	48	4230	138000
12	51	28	36	17	25	5.8	18	7.5	21	32	2780	118000
13	40	20	38	18	25	5.4	20	8.3	16	25	1700	57000
14	29	13	42	19	44	9.1	21	8.7	9	14	1260	37000
15	27	12	72	32	25	5.1	21	8.9	6	7.9	2270	126000
16	40	17	67	24	35	7.1	14	6.1	10	5.7	1640	72000
17	48	21	44	8.1	31	6.2	33	17	11	6.6	1440	46400
18	20	8.5	29	5.3	26	4.9	38	22	8	6.4	1090	29900
19	10	4.0	24	8.4	44	8.1	35	18	10	9.4	687	16600
20	9	3.2	14	5.3	66	12	21	13	12	9.4	509	10800
21	13	4.8	13	5.0	47	8.4	9	5.7	36	27	420	7120
22	24	9.0	23	8.4	67	12	8	9.6	50	45	374	4750
23	19	7.3	22	7.7	66	11	14	22	133	302	351	3790
24	23	9.4	18	5.9	64	11	10	16	174	576	335	3130
25	20	7.9	33	12	49	8.7	16	12	116	364	297	2410
26	30	12	13	4.9	47	8.0	21	13	67	151	244	1760
27	27	10	13	4.9	34	6.0	23	17	48	93	227	1460
28	27	10	12	4.6	28	4.8	30	19	26	51	205	1210
29	19	7.3	9	3.1	37	6.3	28	18	---	---	175	963
30	17	6.9	12	3.8	49	8.2	53	37	---	---	147	765
31	20	8.2	--	--	36	6.0	79	62	---	---	126	640
TOTAL	---	428.5	---	362.5	---	235.6	---	398.2	---	2020.4	---	690897.5

SKUNK RIVER BASIN

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued

WATER-QUALITY RECORDS

SUSPENDED- SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

SKUNK RIVER BASIN

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05474000 SKUNK RIVER AT AUGUSTA, IA--Continued
WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-	SEDI-	SED.	SED.	SED.		
		CHARGE, INST. TEMPER- ATURE WATER (DEG C) (00010)	CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	FALL DIAM. .002 MM (70337)	FALL DIAM. .004 MM (70338)	FALL DIAM. .008 MM (70339)
NOV 13...	1330	12.0	165	38	17	--	--	--
MAR 08...	1145	2.0	470	463	588	--	--	--
12...	1515	--	3990	2430	26200	46	56	67
MAY 01...	1315	16.0	2250	186	1130	--	--	--
JUN 21...	1315	22.5	26800	1380	99900	57	70	76
AUG 22...	1200	23.5	2650	253	1810	41	52	65
		SED. SUSP. FALL DIAM. % FINE THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINE THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINE THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINE THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINE THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINE THAN 1.00 MM (70346)	SED. SUSP. SIEVE DIAM. % FINE THAN .062 MM (70341)
NOV 13...	--	--	--	--	--	--	99	
MAR 08...	--	--	--	--	--	--	95	
12...	80	97	98	100	--	--	--	
MAY 01...	--	--	--	--	--	--	97	
JUN 21...	80	86	87	90	96	100	--	
AUG 22...	80	--	--	--	--	--	99	

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED-MATERIAL, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	BED	BED	BED	BED	BED	BED	BED	BED		
		NUMBER OF SAM- PLING POINTS (COUNT)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
MAR 12...	1545	3	0	1	17	64	84	91	95	99	100
MAY 01...	1315	3	--	0	2	43	82	97	100	--	--
AUG 22...	1200	3	--	0	5	55	90	97	99	100	--

SKUNK RIVER BASIN
05474000 SKUNK RIVER AT AUGUSTA, IA--Continued
WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-	SPE-	PH	TEMPER-	TEMPER-	TUR-	OXYGEN,	BARO-	COLI-	
		CHARGE, INST. CUBIC FEET PER SECOND	SPECIFIC CON- DUC- TANCE (US/CM)	(STAND- ARD UNITS)	ATURE WATER (DEG C)	ATURE AIR (DEG C)	BID- ITY (NTU)	(PER- CENT (MM HG)	METRIC PRES- SURE (MM HG)	FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	
		(00061)	(00095)	(00400)	(00010)	(00020)	(00076)	(00300)	(00301)	(31625)	
NOV 13...	1330	165	618	8.9	12.0	21.0	5.0	12.8	122	745	440
DEC 12...	1200	85	738	8.4	0.0	-18.5	15	15.6	108	755	K17
MAR 08...	1145	470	615	8.4	2.0	9.0	8.0	13.5	99	752	140
MAY 01...	1315	2250	562	8.9	16.0	10.0	43	11.6	119	754	K67
JUN 21...	1315	26800	205	7.5	22.5	24.0	260	8.1	95	749	7400
AUG 22...	1200	2650	565	8.5	23.5	21.0	65	7.1	85	753	2000
<hr/>											
DATE	STREP- TOCCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L)	CALCIUM DIS- SOLVED (00900)	MAGNE- SIUM, DIS- SOLVED (00915)	SODIUM, DIS- SOLVED (00925)	SODIUM DIS- SOLVED (00930)	SODIUM AD- SORP- TION RATIO (00932)	POTAS- SIUM, DIS- SOLVED (00931)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS AS K) (00935)	CAR- BONATE WATER DIS IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00452) (00453)
NOV 13...	290	260	68	23	31	20	0.8	6.7	218	15	235
DEC 12...	32	290	71	28	39	22	1	5.0	227	0	277
MAR 08...	930	270	70	23	24	16	0.6	5.1	179	0	218
MAY 01...	K120	E270	69	24	17	12	0.4	3.6	194	15	207
JUN 21...	11000	81	22	6.4	3.2	7	0.2	5.1	31	0	37
AUG 22...	28000	160	27	23	11	13	0.4	3.6	221	0	269
<hr/>											
DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (00940)	FLUO- RIDE, DIS- SOLVED (00950)	SILICA, DIS- SOLVED (00955)	SOLIDS, RESIDUE AT 180 DEG. C (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (70300)	SOLIDS, DIS- SOLVED (TONS AC-FT) (70301)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70303)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00605)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00613)
NOV 13...	77	28	0.30	2.3	357	367	0.49	159	0.88	<0.100	<0.010
DEC 12...	95	41	E0.30	1.6	434	422	0.59	100	0.26	1.20	<0.010
MAR 08...	83	30	0.20	4.9	390	365	0.53	495	0.75	3.90	0.030
MAY 01...	60	26	0.40	4.3	351	343	0.48	2130	2.1	4.80	0.050
JUN 21...	12	7.6	0.30	7.8	127	102	0.17	9190	1.9	4.30	0.080
AUG 22...	44	17	1.0	16	369	304	0.50	2640	1.2	6.40	0.060

K Results based on colony count outside ideal range.

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued
WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

MISSISSIPPI RIVER MAIN STEM

05474500 MISSISSIPPI RIVER AT KEOKUK, IA

LOCATION.--Lat 40°23'37", long 91°22'27", in SE1/4 SW1/4 sec.30, T.65 N., R.4 W., Lee County, Hydrologic Unit 07080104, near right bank in tailwater of dam and powerplant of Union Electric Co. at Keokuk, 0.2 mi upstream from bridge on U.S. Highway 136, 2.7 mi upstream from Des Moines River, and at mile 364.2 upstream from Ohio River.

DRAINAGE AREA.--119,000 mi², approximately.

PERIOD OF RECORD.--January 1878 to current year.

GAGE.--Water-stage recorder. Datum of gage is 477.41 ft above NGVD (levels by U.S. Army Corps of Engineers). Jan. 1, 1878 to May 1913, nonrecording gage at Galland (formerly Nashville), 8 mi upstream; zero of gage was set to low-water mark of 1864, or 496.52 ft above NGVD.

REMARKS.--Discharge computed from records of operation of turbines in powerplant and spillway gates in dam. Minor flow regulation caused by powerplant since 1913 and navigation dams. Records for May 1913 to September 1937 adjusted for change in contents in Keokuk Reservoir, those after September 1937 unadjusted.

COOPERATION.--Records provided by Union Electric Co.

AVERAGE DISCHARGE.--112 years, 63,920 ft³/s, 7.29 in/yr, 46,310,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 344,000 ft³/s Apr. 24, 1973; maximum gage height, 23.35 ft Apr. 24, 1973; minimum daily discharge, 5,000 ft³/s Dec. 27, 1933.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 6, 1851, reached a stage of 21.0 ft, present site and datum, estimated as 13.5 ft at Galland, discharge, 360,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 263,000 ft³/s June 20-21; minimum daily discharge, 13,400 ft³/s Dec. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22900	25200	21600	16500	25400	25700	63500	69100	109000	187000	102000	143000
2	21200	29100	20200	17400	25400	24400	62500	75400	87200	190000	101000	138000
3	22000	29000	20100	16900	23500	25600	59400	75800	91800	192000	100000	124000
4	19600	25500	16000	17100	23100	27000	59700	88700	77400	185000	111000	120000
5	16800	26200	15100	17200	22400	29100	60600	99900	77700	175000	116000	117000
6	23800	26700	21800	17900	24000	29500	56700	110000	76100	163000	121000	110000
7	22600	27100	24100	20200	25700	29200	54800	110000	80600	153000	120000	97100
8	21000	27200	25100	21700	25200	29600	48000	97500	75500	138000	112000	69500
9	20900	26100	22000	23700	26100	32300	45300	88000	81800	130000	105000	52400
10	19800	25900	21300	22400	29800	47500	42500	88400	91700	117000	96400	50500
11	20700	26600	21900	22200	30700	73800	42400	92000	87800	107000	98200	49100
12	20300	27200	20600	20900	30400	99100	44900	95700	82300	103000	89900	58000
13	20800	26000	17500	20900	33300	101000	52000	86400	82000	102000	82000	72200
14	20700	25800	14800	21700	33800	94300	56000	88400	92100	100000	70100	67500
15	19800	27200	13400	22700	32800	137000	49900	91200	93300	95800	63100	57700
16	19600	26400	15000	24600	26700	150000	48100	92600	139000	92500	51300	59200
17	22400	24500	17400	28300	27200	144000	46300	84000	148000	89400	48500	57100
18	24700	22500	18000	26200	24000	145000	45500	84600	175000	83100	57700	57600
19	26600	22500	17300	26400	25100	145000	38700	87400	190000	71600	66300	56200
20	26200	21200	15700	29400	26700	144000	37400	100000	263000	76200	69800	55300
21	23300	21100	16600	29900	27200	143000	34700	101000	263000	79000	96300	60800
22	21100	22700	13700	30400	27200	141000	32600	99200	262000	88500	110000	64800
23	20900	22300	16900	28600	26500	140000	33200	101000	261000	90900	110000	62200
24	19800	21000	16500	28200	27900	139000	35500	109000	238000	82300	106000	62000
25	19900	20100	17400	27700	25600	140000	36000	120000	233000	72700	106000	62500
26	19900	19500	17800	26500	25700	135000	43000	137000	224000	67300	110000	59400
27	19400	20600	16900	25900	26700	127000	51400	142000	207000	59200	122000	53100
28	20200	22500	16000	25400	26700	114000	54800	139000	192000	50300	135000	47800
29	21100	20000	15900	25200	--	102000	68500	132000	183000	54600	144000	41700
30	20500	20800	15900	26100	--	80800	66600	127000	171000	74500	148000	36000
31	21400	--	16000	24800	--	73500	--	120000	--	99700	146000	--
TOTAL	659900	728500	558500	733000	754800	2868400	1470500	3132300	4435300	3369600	3114600	2161700
MEAN	21290	24280	18020	23650	26960	92530	49020	101000	147800	108700	100500	72060
MAX	26600	29100	25100	30400	33800	150000	68500	142000	263000	192000	148000	143000
MIN	16800	19500	13400	16500	22400	24400	32600	69100	75500	50300	48500	36000
AC-FT	1309000	1445000	1108000	1454000	1497000	5689000	2917000	6213000	8797000	6684000	6178000	4288000

CAL YR 1989 TOTAL 14086600 MEAN 38590 MAX 126000 MIN 11300 AC-FT 27940000
WTR YR 1990 TOTAL 23987100 MEAN 65720 MAX 263000 MIN 13400 AC-FT 47580000

DES MOINES RIVER BASIN

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05476500 DES MOINES RIVER AT ESTHERVILLE, IA

LOCATION.--Lat $43^{\circ}23'51''$, long $94^{\circ}50'38''$, in SW1/4 SE1/4 sec.10, T.99 N., R.34 W., Emmet County, Hydrologic Unit 07100002, on right bank in city park, 1,200 ft downstream from bridge on State Highway 9 at Estherville, 0.1 mi upstream from School Creek, 2.3 mi upstream from Brown Creek, and at mile 404.2.

DRAINAGE AREA.--1,372 mi².

PERIOD OF RECORD.--October 1951 to current year. Prior to November 1951, monthly discharge only, published in WSP 1728.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,247.55 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 6 to Feb. 11, and Feb. 13-27. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--39 years, 374 ft³/s, 3.70 in/yr, 271,000 acre-ft/yr; median of yearly mean discharges, 250 ft³/s, 2.5 in/yr, 181,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,000 ft³/s Apr. 12, 1969, gage height, 17.68 ft, from flood-mark; no flow Jan. 16-18, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and maximum (*):

Date June 19	Time 2215	Discharge (ft ³ /s)	Gage height (ft)	Date No other peak greater than base discharge.	Discharge (ft ³ /s)	Gage height (ft)
		*1,290	*5.28			

Minimum discharge, 1.4 ft³/s Oct. 9, 15, 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.8	3.0	12	3.0	3.8	5.7	55	74	331	251	135	26
2	2.9	2.7	11	3.2	3.6	6.4	56	69	329	232	120	22
3	2.6	3.3	8.8	3.3	3.8	5.6	57	65	359	215	110	19
4	2.5	3.5	7.8	3.5	4.0	6.4	50	58	382	207	104	16
5	2.5	3.9	8.8	3.3	4.3	6.3	42	57	357	201	97	14
6	2.4	4.1	6.6	3.6	4.0	6.6	45	57	303	174	93	11
7	2.1	5.7	5.6	3.2	4.5	6.5	49	51	279	170	87	11
8	1.7	5.1	5.8	3.4	4.0	8.2	47	51	265	173	80	15
9	1.7	5.9	6.2	3.6	4.2	8.2	42	75	245	174	76	12
10	2.4	6.7	4.3	3.2	4.3	9.2	43	83	238	166	71	9.4
11	2.0	6.1	3.0	3.5	4.7	16	50	67	221	153	75	7.9
12	1.9	5.2	2.9	3.2	5.5	27	57	64	212	163	74	7.1
13	2.1	5.3	2.8	3.0	4.5	64	53	57	219	160	67	6.2
14	1.6	5.4	3.1	3.7	4.5	83	50	57	217	144	60	5.9
15	1.5	21	2.8	4.2	4.6	91	48	76	202	138	57	5.4
16	1.9	13	3.0	3.8	4.3	73	50	89	205	128	54	5.4
17	2.5	18	3.2	3.4	3.7	69	55	82	730	116	51	6.6
18	2.5	19	3.1	3.3	3.9	54	47	80	535	108	53	8.0
19	2.8	16	2.9	3.2	4.2	44	43	112	750	199	99	7.1
20	2.9	19	2.9	3.2	4.5	47	45	227	818	227	106	5.7
21	2.3	17	2.8	4.0	4.7	41	45	240	521	191	166	6.0
22	1.5	17	2.7	3.8	4.5	47	46	239	450	164	130	5.4
23	2.0	15	2.5	4.0	4.3	53	49	238	389	149	110	4.7
24	3.0	17	2.8	4.2	4.2	65	54	241	341	130	93	4.7
25	2.9	19	3.1	3.2	4.3	50	49	247	324	126	105	4.7
26	2.4	20	3.0	4.1	4.6	48	47	278	307	148	90	4.4
27	2.2	19	3.2	4.0	4.9	44	46	356	289	137	69	4.5
28	2.1	11	3.5	4.1	5.4	46	50	408	273	127	57	5.0
29	2.1	11	3.4	4.2	---	42	56	392	276	187	48	4.1
30	2.6	12	3.1	3.6	---	48	72	375	255	215	39	3.9
31	3.1	---	2.9	4.2	---	51	---	356	---	163	31	---
TOTAL	71.5	329.9	139.6	111.2	121.8	1172.1	1498	4921	10622	5236	2607	268.1
MEAN	2.31	11.0	4.50	3.59	4.35	37.8	49.9	159	354	169	84.1	8.94
MAX	3.1	21	12	4.2	5.5	91	72	408	818	251	166	26
MIN	1.5	2.7	2.5	3.0	3.6	5.6	42	51	202	108	31	3.9
AC-FT	142	654	277	221	242	2320	2970	9760	21070	10390	5170	532
CFSM	.00	.01	.00	.00	.00	.03	.04	.12	.26	.12	.06	.01
IN.	.00	.01	.00	.00	.00	.03	.04	.13	.29	.14	.07	.01

CAL YR 1989 TOTAL 19058.1 MEAN 52.2 MAX 858 MIN 1.5 AC-FT 37800 CFSM .04 IN. .52
WTR YR 1990 TOTAL 27098.2 MEAN 74.2 MAX 818 MIN 1.5 AC-FT 53750 CFSM .05 IN. .73

DES MOINES RIVER BASIN

05476750 DES MOINES RIVER AT HUMBOLDT, IA

LOCATION.--Lat 42°43'12", long 94°13'06", in SE1/4 SW1/4 sec.1, T.91 N., R.29 W., Humboldt County, Hydrologic Unit 07100002 on left bank 5 ft downstream from First Avenue in city of Humboldt, about 700 ft downstream from City of Humboldt water plant, 3.2 mi downstream from dam, 3.2 mi upstream from Indian Creek, 3.9 mi upstream from East Fork Des Moines River, and at mile 334.3 upstream from mouth of Des Moines River.

DRAINAGE AREA.--2,256 mi².

PERIOD OF RECORD.--October 1964 to current year. Prior to October 1970, published as West Fork Des Moines River at Humboldt.

GAGE.--Water-stage recorder. Datum of gage is 1,053.54 ft above NGVD. Prior to Oct. 3, 1966, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Feb. 15-19, 25, 26, and Mar. 8. Records good except those for estimated daily discharges, which are poor. Daily nonrecording gage readings available in Iowa City district office for period Mar. 7, 1940, to Sept. 30, 1964. Discharge not published for this period because of extreme regulation at dam 3.2 mi upstream from gage. Power generation and streamflow regulation discontinued August 1964. Low-flow discharges occasionally affected by minor regulation. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corp of Engineers data collection platform at station.

AVERAGE DISCHARGE.--26 years, 891 ft³/s, 5.36 in./yr, 645,500 acre-ft/yr; median of yearly mean discharges, 720 ft³/s, 4.3 in./yr, 522,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft³/s Apr. 14, 1969, gage height, 15.40 ft; minimum daily discharge, 13 ft³/s Nov. 12, 1976, Jan. 12 to Feb. 2, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 23, 1947, reached a stage of 12.2 ft, discharge, 11,000 ft³/s at present site and datum.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,800 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 22	0330	*3,030	*6.81			No other peak greater than base discharge.	

Minimum discharge, 15 ft³/s Nov. 16, Dec. 23, 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	49	37	19	27	31	104	121	528	689	610	271
2	34	40	38	18	25	39	88	115	560	623	506	256
3	25	42	34	18	27	32	92	115	696	587	446	240
4	26	146	38	18	27	39	101	124	968	532	398	220
5	27	48	37	18	27	43	103	116	953	489	343	203
6	27	38	41	18	27	39	99	112	886	446	307	186
7	26	42	38	18	27	48	62	106	784	420	282	184
8	27	45	39	18	27	54	45	98	700	389	261	201
9	30	41	38	18	28	58	76	142	618	351	243	174
10	29	35	38	18	28	71	123	167	574	342	226	161
11	30	39	33	18	31	86	105	193	500	339	221	153
12	30	36	32	20	33	128	90	229	475	373	201	147
13	30	42	28	20	30	177	91	223	498	406	191	141
14	31	41	26	23	24	205	103	206	504	367	186	134
15	36	46	23	26	23	177	112	197	534	343	176	127
16	37	23	21	25	23	186	111	208	829	314	169	120
17	29	25	20	25	22	176	98	183	2070	286	189	116
18	28	24	19	25	23	158	97	175	2180	269	169	138
19	33	31	18	25	24	128	96	292	2580	359	171	139
20	37	37	18	31	24	136	106	311	2850	468	171	124
21	37	36	17	28	25	128	99	410	2940	466	231	119
22	40	47	16	30	28	135	91	472	2890	445	267	110
23	37	33	16	30	27	119	94	511	2470	381	298	99
24	40	36	16	29	23	109	107	477	1940	332	305	93
25	41	44	24	28	24	110	128	481	1510	304	444	88
26	42	48	27	28	26	107	119	475	1230	303	625	86
27	41	58	27	30	27	115	120	469	1050	340	567	83
28	44	32	25	26	26	111	119	468	938	418	480	80
29	47	38	21	27	---	105	117	500	844	775	408	78
30	49	34	20	28	---	101	130	545	761	749	348	76
31	49	---	20	24	---	101	---	545	---	691	305	---
TOTAL	1067	1276	845	727	733	3252	3026	8787	36860	13596	9744	4347
MEAN	34.4	42.5	27.3	23.5	26.2	105	101	283	1229	439	314	145
MAX	49	146	41	31	33	205	130	545	2940	775	625	271
MIN	25	23	16	18	22	31	45	98	475	269	169	76
AC-FT	2120	2530	1680	1440	1450	6450	6000	17430	73110	26970	19330	8620
CFSM	.02	.02	.01	.01	.01	.05	.04	.13	.54	.19	.14	.06
IN.	.02	.02	.01	.01	.01	.05	.05	.14	.61	.22	.16	.07

CAL YR 1989 TOTAL 44913 MEAN 123 MAX 965 MIN 16 AC-FT 89080 CFSM .05 IN. .74
WTR YR 1990 TOTAL 84260 MEAN 231 MAX 2940 MIN 16 AC-FT 167100 CFSM .10 IN. 1.39

DES MOINES RIVER BASIN

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05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IA

LOCATION.--Lat 42°43'26", long 94°11'30", in NW1/4 SE1/4 sec. 6, T. 91 N., R. 28 W., Humboldt County, Hydrologic Unit 07100003, on right bank 50 ft upstream from old mill dam, in city park at east edge of Dakota City, 500 ft upstream from bridge on county highway P56, 0.6 mi downstream from bridge on State Highway 3, 3.4 mi upstream from confluence with Des Moines River, and at mile 333.8 upstream from mouth of Des Moines River.

DRAINAGE AREA.--1,308 mi².

PERIOD OF RECORD.--March 1940 to current year. Prior to October 1954, published as "near Hardy".

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1944, 1945-47 (M).

GAGE.--Water-stage recorder. Datum of gage is 1,038.71 ft above NGVD. Prior to Oct. 1, 1954, nonrecording gage at site 8 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Dec. 13 to Mar. 8, and Aug. 28 to Sept. 2. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--50 years, 536 ft³/s, 5.56 in/yr, 388,300 acre-ft/yr; median of yearly mean discharges, 490 ft³/s, 5.1 in/yr, 355,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,800 ft³/s June 21, 1954, gage height, 16.95 ft, from flood-mark, site and datum then in use; minimum daily discharge, 4.8 ft³/s Jan. 11-14, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1954, reached a stage of 24.02 ft, discharge, 17,400 ft³/s at present site. Flood of September 1938 reached a stage of 17.4 ft, discharge, about 22,000 ft³/s, site and datum in use during the period 1940-54.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft³/s and maximum (*):

Date	Time	Discharge		Gage height		Date	Time	Discharge		Gage height	
		(ft ³ /s)	(ft)	(ft)	(ft)						
June 20	2200	*2,100	*11.65			No other peak greater than base discharge.					

Minimum daily discharge, 8.2 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	29	26	12	20	18	45	98	257	1010	906	790
2	11	28	27	13	19	20	46	96	254	1010	956	690
3	10	28	25	14	18	22	44	84	388	965	971	616
4	11	27	26	16	17	20	41	78	700	818	944	443
5	11	28	32	18	16	21	39	67	743	651	825	368
6	13	29	36	19	17	22	37	61	788	535	679	332
7	13	30	27	20	17	30	37	58	770	461	583	300
8	13	31	25	21	18	46	36	54	669	404	514	280
9	13	31	25	22	19	56	41	66	543	362	444	249
10	13	29	25	22	20	57	55	82	449	328	382	244
11	14	30	23	21	19	68	51	153	390	297	328	263
12	14	30	17	21	20	69	52	172	348	285	284	253
13	15	29	14	16	19	78	50	214	320	266	249	232
14	14	29	13	17	18	122	49	205	370	249	222	203
15	16	29	12	19	17	180	48	190	556	234	200	182
16	16	23	11	21	15	164	49	197	659	217	185	165
17	18	25	10	18	13	136	48	181	1460	197	178	152
18	17	24	9.8	17	12	114	42	160	1890	181	165	153
19	18	27	9.6	16	12	88	40	268	1910	248	167	150
20	18	31	9.4	14	13	77	43	342	2070	362	222	144
21	20	28	9.2	17	14	71	40	414	2070	426	473	140
22	20	26	9.0	18	15	69	39	496	1950	606	842	130
23	21	22	8.2	19	16	62	40	539	1900	627	1000	119
24	22	27	8.8	18	17	60	38	537	1820	533	1080	116
25	24	28	9.0	17	15	58	178	507	1720	429	1160	111
26	24	27	10	20	16	55	160	456	1620	368	1290	105
27	25	30	11	19	16	51	195	413	1510	360	1360	102
28	25	25	14	22	17	49	173	374	1390	331	1330	100
29	25	27	13	19	---	48	129	340	1220	367	1250	92
30	28	26	15	22	---	47	105	310	1060	539	1090	85
31	30	---	13	21	---	46	---	279	---	778	940	---
TOTAL	542	833	523.0	569	465	2024	1991	7491	31794	14444	21219	7309
MEAN	17.5	27.8	16.9	18.4	16.6	65.3	66.4	242	1060	466	684	244
MAX	30	31	36	22	20	180	195	539	2070	1010	1360	790
MIN	10	22	8.2	12	12	18	36	54	254	181	165	85
AC-FT	1080	1650	1040	1130	922	4010	3950	14860	63060	28650	42090	14500
CFSM	.01	.02	.01	.01	.01	.05	.05	.18	.81	.36	.52	.19
IN.	.02	.02	.01	.02	.01	.06	.06	.21	.90	.41	.60	.21

CAL YR 1989 TOTAL 30208.0 MEAN 82.8 MAX 1620 MIN 8.2 AC-FT 59920 CFSM .06 IN. .86
WTR YR 1990 TOTAL 89204.0 MEAN 244 MAX 2070 MIN 8.2 AC-FT 176900 CFSM .19 IN. 2.54

DES MOINES RIVER BASIN

05480500 DES MOINES RIVER AT FORT DODGE, IA

LOCATION.--Lat 42°30'22", long 94°12'04", in NW1/4 SW1/4 sec.19, T.89 N., R.28 W., Webster County, Hydrologic Unit 07100004, on right bank 400 ft upstream from Soldier Creek, 1,800 ft downstream from Illinois Central Railroad bridge in Fort Dodge, 2,000 ft downstream from Lizard Creek, and at mile 314.6.

DRAINAGE AREA.--4,190 mi².

PERIOD OF RECORD.--April 1905 to July 1906 (no winter records), October 1913 to September 1927 (published as "at Kalo"), October 1946 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1308: 1924, 1925 (M).

GAGE.--Water-stage recorder. Datum of gage is 969.38 ft above NGVD. See WSP 1728 for history of changes prior to Dec. 8, 1949.

REMARKS.--Estimated daily discharges: Dec. 2, 3, Dec. 16 to Jan. 7, Jan. 11 to Feb. 9, Feb. 13 to Mar. 1, and Aug. 7-9. Records good, except for estimated daily discharges, which are poor. Occasional minor regulation caused by dam 0.8 mi upstream from gage. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and data collection platform and City of Fort Dodge gage-height telemeter at station.

AVERAGE DISCHARGE.--58 years (water years 1914-27, 1947-90), 1,531 ft³/s, 4.96 in/yr, 1,109,000 acre-ft/yr; median of yearly mean discharges, 1,210 ft³/s, 3.9 in/yr, 877,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,600 ft³/s Apr. 8, 1965, gage height, 17.79 ft; maximum gage height, 19.62 ft, from floodmark, June 23, 1947, present site and datum; minimum daily discharge, 14 ft³/s Nov. 3, 1955.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 17	2145	13,700	9.62			*14,300	*9.83

Minimum daily discharge, 20 ft³/s Dec. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	72	67	30	60	61	202	289	1140	2550	2140	1600
2	55	70	64	28	58	73	192	279	1160	2360	2000	1400
3	60	66	60	32	54	74	182	269	1730	2190	1870	996
4	55	74	64	39	52	75	183	270	2490	1900	1750	742
5	64	132	74	43	50	81	178	264	2750	1650	1540	643
6	61	75	75	47	52	79	170	248	3010	1420	1310	583
7	57	70	64	50	54	88	169	235	2600	1260	1180	532
8	57	71	70	52	58	205	133	231	2180	1150	1060	534
9	56	73	87	54	62	218	153	296	1840	1010	932	504
10	58	70	68	54	64	185	239	449	1550	958	797	466
11	58	68	61	54	62	197	271	673	1350	914	724	460
12	58	69	60	52	68	226	278	712	1230	1860	686	451
13	56	68	57	40	66	312	279	676	1310	2530	606	419
14	57	71	54	43	60	554	278	631	2100	1850	552	380
15	58	70	52	50	54	766	281	585	2840	1430	511	335
16	63	58	36	54	52	749	272	981	3820	1170	474	317
17	57	54	35	48	45	634	263	1160	8700	988	466	302
18	53	52	33	45	43	527	240	850	11800	867	456	335
19	53	63	32	42	42	417	231	3610	11500	1150	425	330
20	55	70	30	38	45	368	241	3760	12200	2470	469	314
21	57	67	28	43	48	338	235	2930	10100	2310	619	297
22	58	70	24	50	54	325	221	2430	8470	2000	1130	278
23	59	51	22	54	56	282	217	2380	7820	1720	1380	262
24	60	66	20	50	60	255	217	2330	6720	1450	1520	254
25	60	77	22	48	54	251	267	2280	5410	1300	1910	251
26	61	66	23	56	56	242	368	2210	4570	1340	2870	245
27	62	87	26	54	58	236	357	1950	3950	1600	2740	239
28	63	91	32	64	60	226	392	1650	3630	1790	2260	233
29	65	72	31	56	---	219	325	1460	3250	2710	1990	224
30	71	68	32	64	---	213	311	1340	2860	2390	1820	216
31	75	---	31	63	---	206	---	1230	---	2240	1700	--
TOTAL	1836	2131	1434	1497	1547	8682	7345	38658	134080	52527	39887	14142
MEAN	59.2	71.0	46.3	48.3	55.2	280	245	1247	4469	1694	1287	471
MAX	75	132	87	64	68	766	392	3760	12200	2710	2870	1600
MIN	53	51	20	28	42	61	133	231	1140	867	425	216
AC-FT	3640	4230	2840	2970	3070	17220	14570	76680	265900	104200	79120	28050
CFSM	.01	.02	.01	.01	.01	.07	.06	.30	1.07	.40	.31	.11
IN.	.02	.02	.01	.01	.01	.08	.07	.34	1.19	.47	.35	.13

CAL YR 1989	TOTAL 91572	MEAN 251	MAX 2960	MIN 20	AC-FT 181600	CFSM .06	IN. .81
WTR YR 1990	TOTAL 303766	MEAN 832	MAX 12200	MIN 20	AC-FT 602500	CFSM .20	IN. 2.70

DES MOINES RIVER BASIN

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05481000 BOONE RIVER NEAR WEBSTER CITY, IA

LOCATION.--Lat $42^{\circ}26'01''$, long $93^{\circ}48'12''$, in NW1/4 SE1/4 sec. 18, T.88 N., R.25 W., Hamilton County, Hydrologic Unit 07100005, on right bank 100 ft upstream from bridge on State Highway 17, 2.5 mi south of Webster City, and 3.2 mi downstream from Brewers Creek.

DRAINAGE AREA.--844 mi².

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1308: 1940 (M), WSP 1708: 1956.

GAGE.--Water-stage recorder. Datum of gage is 989.57 ft above NGVD. Prior to June 26, 1940, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 17 to Mar. 7. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and gage-height satellite data collection platform at station.

AVERAGE DISCHARGE.--50 years, 409 ft³/s, 6.58 in/yr, 296,300 acre-ft/yr; median of yearly mean discharges, 360 ft³/s, 5.8 in/yr, 261,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,300 ft³/s June 22, 1954, gage height, 18.55 ft; no flow Feb. 7, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1896, 19.1 ft about June 10, 1918, from floodmarks, from information by local resident, discharge, 21,500 ft³/s. Flood of June 18, 1932, reached a stage of 16.0 ft, discharge, 15,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 19	2315	3,410	7.25	July 20	1645	2,340	5.93
June 17	0630	*5,670	*9.40	July 29	0645	2,450	6.06
June 19	1600	5,010	8.82				

Minimum daily discharge, 7.0 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	32	92	34	9.4	21	26	221	186	540	880	1060	402
2	30	81	32	8.8	21	27	202	171	510	757	822	322
3	30	75	29	10	21	27	183	160	715	620	699	265
4	29	72	31	12	21	29	180	159	896	524	557	220
5	62	72	35	14	22	30	172	150	938	477	456	188
6	44	69	35	13	22	31	156	140	979	407	374	158
7	42	63	30	15	23	55	144	135	952	354	312	133
8	38	60	31	14	24	263	143	130	826	314	263	138
9	35	59	32	14	25	354	156	214	733	273	224	155
10	35	55	30	14	25	282	209	380	638	256	192	224
11	35	51	25	14	26	435	300	434	570	247	171	197
12	35	49	24	15	27	581	332	419	594	314	149	159
13	34	48	22	13	23	577	320	385	1480	324	131	133
14	32	49	21	14	20	1450	306	345	1420	282	117	111
15	33	48	19	17	19	1810	295	316	1900	261	105	95
16	72	42	13	16	18	1610	286	305	2270	229	97	84
17	63	35	12	15	17	1220	270	317	4900	197	92	76
18	51	32	11	14	18	938	242	320	3920	178	81	89
19	46	39	10	15	20	715	236	2160	4260	181	80	105
20	44	42	9.8	15	19	594	235	3240	4160	1740	87	98
21	44	39	9.0	14	22	520	216	2310	3110	2020	948	104
22	44	41	7.0	16	23	482	202	1690	2540	1460	697	107
23	42	30	7.1	18	23	420	202	1460	2510	1090	482	101
24	40	38	7.3	17	22	375	198	1270	2050	781	381	96
25	40	41	7.8	16	20	348	183	1230	1700	599	439	91
26	39	35	8.2	19	20	317	172	1210	1350	1120	607	88
27	38	39	8.2	18	22	289	219	1030	1140	1810	1030	86
28	39	37	10	21	25	273	244	881	1010	2100	1170	81
29	43	38	9.7	20	---	258	232	750	868	2320	1110	74
30	60	35	10	22	---	240	212	667	824	1780	774	70
31	79	---	9.6	21	---	228	---	592	---	1320	526	---
TOTAL	1330	1506	579.7	474.2	609	14804	6668	23156	50303	25215	14233	4250
MEAN	42.9	50.2	18.7	15.3	21.7	478	222	747	1677	813	459	142
MAX	79	92	35	22	27	1810	332	3240	4900	2320	1170	402
MIN	29	30	7.0	8.8	17	26	143	130	510	178	80	70
AC-FT	2640	2990	1150	941	1210	29360	13230	45930	99780	50010	28230	8430
CFSM	.05	.06	.02	.02	.03	.57	.26	.89	1.99	.96	.54	.17
IN.	.06	.07	.03	.02	.03	.65	.29	1.02	2.22	1.11	.63	.19

CAL YR 1989 TOTAL 36944.7 MEAN 101 MAX 1920 MIN 7.0 AC-FT 73280 CFSM .12 IN. 1.63
WTR YR 1990 TOTAL 143127.9 MEAN 392 MAX 4900 MIN 7.0 AC-FT 283900 CFSM .46 IN. 6.31

DES MOINES RIVER BASIN

05481300 DES MOINES RIVER NEAR STRATFORD, IA

LOCATION.--Lat 42°15'04", long 93°59'52", in NW1/4 NE1/4 sec.21, T.86 N. R.27 W., Webster County, Hydrologic Unit 07100004, on right bank 6 ft downstream from bridge on State Highway 175, 0.1 mi downstream from Skillet Creek, 4.0 mi southwest of Stratford, 7.3 mi downstream from Boone River and at mile 276.7.

DRAINAGE AREA.--5,452 mi².

PERIOD OF RECORD.--April 1920 to current year in reports of U.S. Geological Survey. Published as "near Boone" 1920-67. Monthly discharge only for some periods, published in WSP 1308. December 1904 to April 1920 (fragmentary gage heights during high-water periods only) in reports of U.S. Weather Bureau.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1925-27, 1934. WSP 1708: 1955.

GAGE.--Water-stage recorder. Datum of gage is 894.00 ft above NGVD. Prior to May 1, 1920, nonrecording gage 16.6 mi downstream at datum 23.49 ft lower. Oct. 9, 1924, to Jan. 10, 1933, nonrecording gage 17.6 mi downstream at datum 28.53 ft lower. Jan. 11, 1933, to Sept. 30, 1934, nonrecording gage 17.9 mi downstream at datum 22.25 ft lower. Oct. 1, 1934 to Feb. 6, 1935, nonrecording gage and Feb. 7, 1935 to Sept. 30, 1967, water-stage recorder 17.9 mi downstream at datum 21.84 ft lower.

REMARKS.--Estimated daily discharges: Dec. 4 to Mar. 5. Records good except those for estimated daily discharges, which are poor. Occasional minor regulation caused by dam at Fort Dodge. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--70 years, 1,958 ft³/s, 4.88 in/yr, 1,419,000 acre-ft/yr; median of yearly mean discharges, 1,620 ft³/s, 4.0 in/yr, 1,170,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 57,400 ft³/s June 22, 1954, gage height, 25.35 ft, from graph based on hourly gage readings, site and datum then in use; 29.7 ft, present site and datum; no flow for a short time on Jan. 9, 25, 1938, caused by manipulation of gates in control dam, site then in use; minimum unregulated daily discharge, 13 ft³/s Jan. 23, 24, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 30, 1903, reached a stage of 25.4 ft, from high-water mark, site and datum then in use, discharge, 43,600 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 20	0845	10,000	13.65	June 18	0200	*18,600	*19.01

Minimum daily discharge, 30 ft³/s Dec. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	107	207	195	46	105	135	607	589	2460	4150	4000	2230
2	91	210	189	44	101	152	580	552	2360	3810	3520	2020
3	87	194	184	49	98	145	545	522	3040	3440	3110	1730
4	85	186	127	58	92	138	515	504	3890	3070	2790	1320
5	120	174	123	63	90	160	510	476	4370	2760	2450	1080
6	185	217	122	68	93	139	496	436	5070	2380	2090	946
7	144	200	102	72	95	157	477	408	4650	2110	1780	853
8	126	171	106	75	101	600	458	366	4160	1900	1570	799
9	112	160	121	79	104	963	441	420	3670	1720	1390	782
10	105	157	98	79	105	843	500	734	3130	1610	1230	790
11	104	152	88	79	104	850	622	966	2700	1550	1110	758
12	102	142	85	82	102	1040	744	1170	2430	1810	1000	717
13	102	133	79	74	101	1100	782	1150	3860	3330	927	678
14	106	131	75	70	99	2460	784	1260	5470	3020	827	616
15	101	130	75	73	89	3760	768	1230	7410	2350	750	563
16	140	103	54	79	87	3970	750	1200	9630	1940	689	509
17	218	177	51	89	77	3100	747	1510	16400	1650	641	480
18	174	199	49	99	74	2350	694	1620	18100	1430	604	490
19	143	194	48	95	72	1830	659	5120	16800	1310	570	578
20	126	170	44	92	76	1480	633	9680	17900	2750	619	523
21	119	126	42	90	80	1310	605	8090	16400	5220	840	494
22	115	139	38	92	88	1190	580	6250	14200	4250	1430	469
23	112	132	33	97	95	1060	556	5650	12700	3460	1620	450
24	111	174	30	101	109	945	535	6080	11100	2790	1770	432
25	110	168	31	106	122	871	516	6170	9190	2320	2200	410
26	109	161	33	104	118	816	538	6070	7600	3500	2880	401
27	108	163	36	96	123	770	642	4960	6430	4610	3650	388
28	108	171	39	91	131	722	706	4110	5830	5250	3690	373
29	125	181	44	101	--	696	698	3460	5240	6370	3410	362
30	146	195	53	109	--	669	634	3020	4590	5860	3010	349
31	184	--	54	108	--	638	--	2700	--	4600	2520	--
TOTAL	3825	5017	2448	2560	2731	35059	18322	86473	230780	96320	58687	22590
MEAN	123	167	79.0	82.6	97.5	1131	611	2789	7693	3107	1893	753
MAX	218	217	195	109	131	3970	784	9680	18100	6370	4000	2230
MIN	85	103	30	44	72	135	441	366	2360	1310	570	349
AC-FT	7590	9950	4860	5080	5420	69540	36340	171500	457800	191100	116400	44810
CFSM	.02	.03	.01	.02	.02	.21	.11	.51	1.41	.57	.35	.14
IN.	.03	.03	.02	.02	.02	.24	.13	.59	1.57	.66	.40	.15

CAL YR 1989 TOTAL 162778 MEAN 446 MAX 5350 MIN 30 AC-FT 322900 CFSM .08 IN. 1.11
WTR YR 1990 TOTAL 564812 MEAN 1547 MAX 18100 MIN 30 AC-FT 1120000 CFSM .28 IN. 3.85

DES MOINES RIVER BASIN

145

05481630 SAYLORVILLE LAKE NEAR SAYLORVILLE, IA

LOCATION.--Lat 41°42'13", long 93°41'21", in SE 1/4, SW 1/4 sec.30, T.80 N., R.24 W., Polk County, Hydrologic Unit 07100004, in control tower of Saylorville Dam, 3.2 mi northwest of Saylorville, 4.2 mi upstream from Beaver Creek, and at mile 213.7.

DRAINAGE AREA.--5,823 mi².

PERIOD OF RECORD.--April 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is at NGVD (levels by U.S. Army Corps of Engineers).

REMARKS.--Reservoir is formed by earthfill dam completed in 1976. Storage began in April 1977. Release controlled at intake structure to forechamber of 22 ft diameter concrete conduit through dam. Ungated chute spillway 430 ft in length at right end of dam at elevation 884 ft, contents, 570,000 acre-ft. Conservation pool at elevation 833 ft, contents, 74,000 acre-ft, surface area, 5,400 acres. Flood pool elevation at 890 ft, contents, 676,000 acre-ft, surface area, 16,700 acres. Reservoir is used for flood control, low-flow augmentation, conservation and recreation. Storage tables for water years 1985-1986 published as day second-feet instead of acre-feet storage.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 655,000 acre-ft June 22, 1984; maximum elevation, 889.25 ft June 22, 1984; minimum daily contents, 45,000 acre-ft May 15, 1985; minimum elevation, 832.61 ft Jan. 19, 1979.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 385,000 acre-ft June 25; maximum elevation, 871.19 ft June 25; minimum daily contents, 71,200 acre-ft Mar. 6; minimum elevation, 832.59 ft March 6.

Capacity table (elevation, in feet, and contents, in acre-feet)

805	360	833	74,000	884	570,000
810	2,300	840	116,000	890	676,000
815	7,700	850	190,000	900	938,000
820	19,000	860	278,000	910	1,320,000
830	58,600	880	511,000	915	1,530,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	102000	97000	92300	82000	76100	71600	105000	104000	105000	335000	272000	111000
2	101000	96700	92400	81900	75900	71600	104000	104000	105000	324000	271000	108000
3	100000	96600	91600	81600	75700	71400	103000	104000	105000	315000	270000	105000
4	99900	96500	91400	81300	75500	71500	103000	104000	106000	311000	267000	104000
5	100000	96600	91500	80800	75300	71300	103000	104000	107000	308000	264000	104000
6	100000	96500	91000	80700	75100	71200	103000	104000	109000	303000	260000	104000
7	99800	96400	90700	80500	75000	72600	103000	104000	109000	297000	255000	105000
8	99600	96600	90500	80200	74800	74300	103000	104000	108000	290000	250000	105000
9	99500	96500	90400	80000	74700	76600	104000	112000	105000	284000	245000	105000
10	99000	96300	90400	79900	74500	79200	108000	108000	103000	280000	240000	106000
11	99000	96300	89800	79700	74400	81300	104000	108000	103000	276000	234000	105000
12	98700	96100	89600	79500	74500	83800	105000	108000	104000	275000	227000	105000
13	98500	96300	89300	79200	74500	89500	106000	108000	103000	275000	221000	105000
14	98200	96400	89000	79000	74200	95900	106000	108000	107000	275000	215000	105000
15	98800	97700	88500	78800	74000	104000	106000	108000	108000	273000	207000	105000
16	98500	95800	88100	78700	73700	110000	107000	108000	125000	270000	200000	104000
17	98200	95400	87700	78600	73600	115000	106000	106000	161000	266000	193000	104000
18	98000	94900	87200	78400	73500	110000	106000	106000	203000	262000	186000	105000
19	97800	94700	87200	78300	73300	107000	106000	121000	246000	259000	181000	105000
20	97600	94700	86500	78100	73100	106000	106000	117000	284000	257000	174000	105000
21	97400	94300	86000	78000	73000	105000	105000	126000	323000	259000	167000	105000
22	97200	94500	85500	77800	72900	105000	105000	126000	356000	261000	159000	105000
23	97100	94900	85000	77700	74100	104000	106000	120000	378000	260000	151000	105000
24	96800	94200	84800	77700	72400	104000	106000	113000	392000	258000	145000	105000
25	96700	93600	84400	77400	72200	104000	106000	112000	395000	254000	140000	105000
26	96400	93400	83900	77200	72100	104000	106000	110000	390000	253000	135000	105000
27	96400	93200	83500	77000	71900	104000	105000	106000	380000	255000	132000	106000
28	96300	92900	83200	76800	71700	104000	105000	103000	372000	259000	129000	106000
29	97000	92600	82900	76700	---	104000	104000	103000	361000	266000	128000	106000
30	97000	92400	82500	76500	---	104000	104000	104000	349000	271000	122000	106000
31	96800	---	82100	76300	---	104000	105000	---	272000	117000	---	---
MEAN	98400	95300	87700	78900	74000	92900	105000	109000	210000	278000	199000	105000
MAX	102000	97700	92400	82000	76100	115000	108000	126000	395000	335000	272000	111000
MIN	96300	92400	82100	76300	71700	71200	103000	103000	103000	253000	117000	104000

CAL YR 1989 MEAN 94100 MAX 109000 MIN 69100
WTR YR 1990 MEAN 128000 MAX 395000 MIN 71200

DES MOINES RIVER BASIN

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA

LOCATION.--Lat $41^{\circ}40'50''$, long $93^{\circ}40'05''$, near center of sec. 5, T. 79 N., R. 24 W., Polk County, Hydrologic Unit 07100004, on left bank 5 ft upstream of Fisher Bridge on county highway R6F, 2.0 mi west of Saylorville, 2.1 mi downstream from Rock Creek, 2.3 mi downstream from Saylorville Dam, 2.3 mi upstream from Beaver Creek, and at mile 211.4.

DRAINAGE AREA.--5,841 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1961 to current year.

GAGE.--Water-stage recorder. Datum of gage is 787.42 ft above NGVD (levels by U. S. Army Corps of Engineers). Prior to Aug. 6, 1970, nonrecording gage at same site and datum.

REMARKS.--Records good. Flow regulated by Saylorville Lake (Station 05481630) 2.3 mi upstream since Apr. 12, 1977. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--29 years, 2,766 ft³/s, 6.43 in/yr, 2,004,000 acre-ft/yr; median of yearly mean discharges, 2,150 ft³/s, 5.0 in/yr, 1,560,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 47,400 ft³/s Apr. 10, 1965, gage height, 24.02 ft; minimum daily discharge, 13 ft³/s Jan. 25, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1893, 24.5 ft June 24, 1954, from floodmarks, discharge, 60,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,000 ft³/s June 29, gage height, 14.07 ft; minimum daily discharge 178 ft³/s Nov. 15, 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	201	186	191	193	196	253	899	853	3140	11500	5290	5330
2	201	191	198	193	202	253	882	853	3120	10500	5140	4500
3	201	190	195	191	206	253	772	746	3100	8530	5070	3810
4	201	193	265	190	206	253	580	680	3090	6750	5010	2850
5	213	191	196	191	234	245	525	680	3640	6110	4960	1850
6	199	187	197	192	226	197	520	683	3920	6060	4930	1370
7	194	191	192	191	210	200	490	689	4630	6020	4900	933
8	193	192	197	193	223	256	453	683	5410	5920	4870	1030
9	193	190	197	188	234	233	452	682	5600	5840	4850	1030
10	190	191	191	190	233	228	443	907	4670	5320	4860	1030
11	190	193	193	188	210	240	444	1440	3450	4910	4890	1030
12	191	190	237	189	212	198	445	1750	3170	5100	4800	1030
13	192	187	211	190	223	484	445	2100	3350	5020	4760	1030
14	193	186	202	191	206	518	577	2200	3930	5110	4720	1020
15	194	178	214	190	206	378	775	2190	5200	5160	4670	954
16	194	184	214	188	199	2020	847	2410	6500	4940	4620	877
17	194	186	206	185	207	3320	851	2570	4580	4830	4590	737
18	194	181	194	185	210	3350	857	2210	2400	4760	4550	629
19	194	185	200	188	210	3370	864	2370	2270	4780	4510	626
20	194	187	199	195	228	3520	866	5320	2820	4950	4530	625
21	194	178	227	197	213	2530	865	7320	3440	5010	4660	629
22	194	203	229	195	207	1890	751	9000	3490	4890	5240	628
23	191	198	216	189	202	1700	673	9590	4050	4920	5630	627
24	192	191	222	190	211	1380	674	10100	6490	5010	5570	518
25	192	192	199	194	196	1050	673	9850	8910	5030	5680	432
26	189	194	191	197	230	893	669	8970	10900	5240	5760	431
27	187	198	193	193	253	904	786	8970	11600	5350	5620	429
28	184	197	200	193	253	917	1170	7600	11800	5340	5510	437
29	188	193	201	197	---	913	1400	5100	11900	5390	5460	432
30	185	191	197	197	---	899	1120	3750	11800	5390	5430	436
31	191	---	195	203	---	897	---	3340	---	5400	5380	--
TOTAL	6003	5694	6359	5946	6046	33742	21768	115606	162370	179080	156460	37290
MEAN	194	190	205	192	216	1088	726	3729	5412	5777	5047	1243
MAX	213	203	265	203	253	3520	1400	10100	11900	11500	5760	5330
MIN	184	178	191	185	196	197	443	680	2270	4760	4510	429
AC-FT	11910	11290	12610	11790	11990	66930	43180	229300	322100	355200	310300	73960

CAL YR 1989 TOTAL 175244 MEAN 480 MAX 4670 MIN 178 AC-FT 347600
 WTR YR 1990 TOTAL 736364 MEAN 2017 MAX 11900 MIN 178 AC-FT 1461000

DES MOINES RIVER BASIN

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05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD: Water years 1962 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: December 1967 to September 1971, October 1971 to September 1980 (partial record station), October 1980 to current year.

WATER TEMPERATURES: October 1961 to September 1971, October 1971 to September 1980 (partial record station), October 1980 to current year.

SUSPENDED-SEDIMENT DISCHARGE: October 1961 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis. During periods of partial ice cover, sediment samples are collected in open water channel.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 1,400 microsiemens Feb. 18, 1977; minimum daily, 90 microsiemens Feb. 19, 1971.

WATER TEMPERATURES: Maximum daily, 36.0°C June 29, 1971; minimum daily, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 5,400 mg/L May 14, 1970; minimum daily mean, 1 mg/L Jan. 8, 1965, Sept. 1, 1988, Feb. 9, July 8, 1990.

SEDIMENT LOADS: Maximum daily, 148,000 tons June 12, 1966; minimum daily, 0.56 ton Sept. 1, 1988.

EXTREMES FOR CURRENT YEAR:

SPECIFIC CONDUCTANCE: Maximum daily, 780 microsiemens Sept. 22; minimum daily, 483 microsiemens Mar. 14.

WATER TEMPERATURES: Maximum daily, 29.0°C Sep. 7-9.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 484 mg/L Mar. 13; minimum daily mean, 1 mg/L Feb. 9, Jul. 8.

SEDIMENT LOADS: Maximum daily, 5,150 tons Jun. 16; minimum daily, 0.63 tons Feb. 9.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	620	627	686	602	577	---	657	---	556	652	---
2	584	618	---	---	---	---	685	606	---	568	614	---
3	576	---	---	684	---	---	678	679	---	544	585	532
4	593	---	670	---	---	---	680	695	600	---	---	644
5	614	---	---	595	577	628	688	671	---	● 529	---	608
6	620	561	670	---	---	---	673	700	650	522	623	660
7	616	---	---	577	---	---	690	600	540	624	624	635
8	618	586	---	659	---	---	655	697	660	565	592	---
9	623	---	669	---	585	636	666	702	580	647	---	---
10	578	605	---	---	---	---	672	672	600	620	573	595
11	578	---	684	669	---	680	674	671	590	---	705	580
12	587	---	---	670	660	665	---	610	650	623	665	665
13	603	628	681	---	554	672	---	580	650	585	693	693
14	601	---	---	690	672	483	---	680	580	638	615	615
15	628	619	---	---	623	---	691	590	655	566	---	---
16	603	---	683	641	646	635	673	701	600	640	---	670
17	592	621	---	---	---	---	659	691	610	---	540	730
18	597	---	---	---	---	---	675	653	526	---	---	655
19	602	---	696	655	606	637	663	665	553	---	---	665
20	592	577	---	---	---	657	660	---	554	604	521	675
21	602	579	---	---	675	656	---	691	558	---	---	652
22	550	---	702	674	673	646	---	668	562	---	599	780
23	557	---	---	---	---	634	652	687	---	---	588	645
24	573	---	707	---	---	661	650	624	557	625	678	680
25	588	651	---	674	---	---	619	661	562	---	590	675
26	588	---	---	663	680	648	---	572	578	---	---	665
27	608	671	---	---	692	---	---	524	597	573	620	620
28	617	---	701	---	675	686	---	685	559	---	---	610
29	612	590	---	665	---	662	654	540	556	680	599	745
30	613	---	---	---	---	688	646	600	---	640	605	---
31	614	---	---	583	---	---	---	650	---	623	657	---

DES MOINES RIVER BASIN

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19.0	10.0	5.0	5.0	5.0	8.0	---	10.0	---	25.0	26.0	---
2	19.0	8.0	---	---	---	8.0	10.0	---	26.0	25.0	25.0	---
3	18.0	---	---	5.0	---	8.0	10.0	---	26.0	25.0	27.0	27.0
4	18.0	---	---	---	---	8.0	10.0	19.0	---	---	28.0	28.0
5	18.0	---	5.0	5.0	5.0	8.0	8.0	10.0	20.0	26.0	---	28.0
6	19.0	8.0	5.0	---	---	8.0	10.0	20.0	26.0	25.0	28.0	28.0
7	18.0	---	---	5.0	---	8.0	10.0	20.0	26.0	25.0	29.0	29.0
8	18.0	---	---	5.0	---	8.0	10.0	21.0	26.0	24.0	29.0	29.0
9	18.0	---	3.0	---	6.0	8.0	8.0	10.0	21.0	26.0	---	29.0
10	18.0	6.0	---	---	6.0	8.0	8.0	10.0	21.0	26.0	25.0	27.0
11	18.0	---	3.0	5.0	---	8.0	8.0	10.0	22.0	26.0	25.0	27.0
12	18.0	---	---	6.0	8.0	8.0	---	23.0	26.0	25.0	27.0	27.0
13	18.0	6.0	3.0	---	11.0	9.0	---	23.0	26.0	25.0	27.0	27.0
14	18.0	---	---	5.0	6.0	10.0	---	10.0	23.0	---	25.0	27.0
15	18.0	6.0	---	---	7.0	---	10.0	23.0	25.0	25.0	25.0	---
16	18.0	---	3.0	5.0	6.0	7.0	10.0	10.0	23.0	26.0	---	25.0
17	18.0	6.0	---	---	---	10.0	---	23.0	---	25.0	23.0	23.0
18	18.0	---	---	---	---	10.0	10.0	---	---	---	25.0	25.0
19	18.0	---	2.0	5.0	6.0	8.0	10.0	16.0	23.0	---	25.0	25.0
20	18.0	5.0	---	---	---	8.0	10.0	---	25.0	26.0	25.0	22.0
21	18.0	5.0	---	---	6.0	8.0	---	16.0	25.0	---	---	22.0
22	18.0	---	2.0	5.0	6.0	8.0	---	16.0	26.0	---	27.0	22.0
23	18.0	---	---	---	8.0	10.0	16.0	---	---	27.0	20.0	20.0
24	18.0	---	2.0	---	8.0	11.0	16.0	26.0	26.0	27.0	20.0	20.0
25	18.0	7.0	---	5.0	---	11.0	16.0	27.0	---	27.0	27.0	20.0
26	16.0	---	---	---	---	8.0	11.0	---	27.0	26.0	---	20.0
27	12.0	6.0	---	---	---	8.0	---	---	27.0	26.0	27.0	20.0
28	12.0	---	3.0	---	8.0	8.0	---	16.0	27.0	---	---	20.0
29	12.0	6.0	---	5.0	---	8.0	10.0	16.0	25.0	26.0	27.0	20.0
30	10.0	---	---	---	---	8.0	10.0	16.0	---	26.0	27.0	---
31	10.0	---	---	---	---	---	---	17.0	---	26.0	27.0	27.0

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH						
1	9	5.1	16	8.1	13	6.5	9	4.8	14	7.6	21	14
2	9	5.1	9	4.7	4	2.1	8	4.4	8	4.1	22	15
3	9	5.1	5	2.7	8	4.8	8	4.4	7	4.2	23	16
4	10	5.2	16	8.3	23	19	9	4.4	8	4.5	21	14
5	10	6.0	18	9.3	6	3.2	9	4.4	4	2.7	12	8.0
6	10	5.3	17	8.6	6	3.4	8	4.1	11	6.7	12	6.5
7	10	5.4	10	5.1	6	3.3	5	2.8	13	7.1	12	6.6
8	12	6.0	8	4.2	6	3.4	5	2.8	5	3.1	16	11
9	12	6.4	9	4.6	11	5.8	5	2.5	1	.63	14	8.9
10	3	1.8	8	4.4	10	5.0	4	2.2	2	1.4	15	9.1
11	14	7.3	9	4.8	10	5.2	4	2.2	9	5.4	30	19
12	6	3.2	8	4.1	38	26	4	2.2	10	5.6	20	10
13	11	5.5	7	3.7	11	6.1	4	2.2	10	6.2	484	722
14	18	9.3	7	3.7	10	5.6	4	2.2	15	8.2	472	720
15	10	5.2	11	5.4	10	6.1	6	3.3	16	9.1	97	102
16	11	5.9	10	5.0	10	5.5	13	6.4	17	9.1	282	2150
17	6	3.4	9	4.7	9	5.3	10	5.1	15	8.2	18	160
18	3	1.8	9	4.6	10	5.3	12	5.8	3	1.4	16	146
19	15	7.7	11	5.3	10	5.4	11	5.8	2	.89	24	216
20	8	4.4	14	7.2	10	5.6	12	6.1	3	1.9	31	294
21	3	1.6	12	5.9	10	6.2	11	5.8	9	5.0	46	317
22	4	2.0	12	6.7	8	4.9	5	2.6	13	7.4	44	226
23	12	6.1	12	6.3	6	3.8	5	2.6	14	7.6	38	176
24	4	2.0	12	6.1	5	3.0	6	2.9	14	7.9	35	133
25	16	8.3	14	7.1	6	3.4	4	2.2	13	7.0	56	150
26	20	10	14	7.1	8	4.0	5	2.7	15	9.4	69	167
27	27	13	12	6.7	8	4.1	6	3.4	17	11	67	164
28	26	13	10	5.2	8	4.1	7	3.6	20	14	59	147
29	22	11	3	1.7	8	4.2	6	3.3	---	---	37	91
30	9	4.3	3	1.4	8	4.0	6	3.2	---	---	33	81
31	3	1.5	---	---	9	4.5	23	12	---	---	32	80
TOTAL	---	177.9	---	162.7	---	178.8	---	122.4	---	167.32	---	6380.1

DES MOINES RIVER BASIN

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05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued
WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)										
APRIL												
1	32	80	18	42	21	181	4	119	107	1530	52	753
2	31	77	13	29	36	305	7	195	124	1720	68	818
3	42	87	12	24	35	293	22	493	110	1500	70	722
4	83	137	17	32	31	256	17	326	108	1470	35	253
5	53	79	13	24	52	521	5	81	109	1460	25	128
6	55	83	11	20	22	231	7	113	114	1510	18	67
7	49	70	13	24	36	457	3	44	135	1780	33	88
8	32	42	12	22	36	516	1	15	52	685	61	169
9	24	31	13	25	38	560	3	55	40	529	68	189
10	2	3.1	15	37	196	2130	16	216	33	426	62	172
11	4	5.0	15	57	272	2470	30	395	8	99	38	105
12	47	60	17	83	270	2300	4	49	13	170	24	67
13	33	40	23	133	301	2630	5	69	30	390	37	102
14	34	54	22	132	267	2720	8	107	13	168	37	102
15	36	77	14	83	278	3820	10	133	14	182	44	113
16	35	81	35	225	300	5150	14	181	22	279	51	120
17	33	77	29	198	39	475	19	254	20	246	66	124
18	28	65	27	161	31	194	28	354	49	598	82	140
19	18	42	27	172	76	485	37	479	109	1330	79	134
20	17	39	15	188	41	314	43	570	68	831	61	103
21	19	45	24	489	37	341	48	644	42	522	49	84
22	23	45	29	705	22	205	65	862	36	519	36	61
23	56	103	29	750	19	223	74	974	54	814	31	53
24	52	95	29	801	38	669	47	639	28	424	38	52
25	38	69	33	866	26	627	56	769	31	477	35	40
26	19	35	27	663	28	818	67	954	35	547	29	34
27	17	37	23	567	30	943	69	999	43	648	32	37
28	21	71	27	541	20	644	65	937	40	597	22	26
29	13	51	41	560	13	427	69	1000	40	585	13	16
30	19	52	29	292	8	262	121	1760	98	1440	13	15
31	---	---	22	199	---	---	134	1950	45	651	---	---
TOTAL	---	1832.1	---	8144	---	31167	---	15736	---	24127	---	4887
YEAR		93082.32										

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	TEMPER-ATURE (DEG C) (00010)	INST. SECOND (00061)	DIS-CHARGE,	SEDIMENT, SUS-PENDED (MG/L) (80154)	SEDIMENT, SUS-PENDED (T/DAY) (80155)	SED. SUSP. DIAM. SIEVE DIAM. % FINER THAN .062 MM (70331)
				CUBIC FEET PER SECOND (80154)		SUS-PENDED (T/DAY) (80155)	
OCT 02...	1045	19.0	197	28	15	100	
NOV 13...	1315	7.0	191	9	4.6	98	
MAR 29...	1255	7.0	918	28	69	95	
APR 24...	1155	14.0	666	39	70	87	
MAY 21...	1300	20.0	4650	35	439	66	
AUG 16...	1400	20.0	4650	27	339	67	

DES MOINES RIVER BASIN

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED-MATERIAL, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAMPLE	BED	BED	BED	BED	
		LOC- ATION, CROSS SECTION (FT FM L BANK)	NUMBER OF SAM- PLING POINTS (00009)	MAT. SIEVE DIAM. .062 MM (00063)	MAT. SIEVE DIAM. .125 MM (80164)	MAT. SIEVE DIAM. .250 MM (80166)	
APR 24...	1210	--	5	0	1	5	
AUG 16...	1436	285	1	2	17	76	
16...	1437	346	1	0	1	6	
16...	1438	468	1	--	0	3	
		BED	BED	BED	BED	BED	
		MAT.	MAT.	MAT.	MAT.	MAT.	
		SIEVE	SIEVE	SIEVE	SIEVE	SIEVE	
		DIAM.	DIAM.	DIAM.	DIAM.	DIAM.	
		% FINE THAN 1.00 MM (80168)	% FINE THAN 2.00 MM (80169)	% FINE THAN 4.00 MM (80170)	% FINE THAN 8.00 MM (80171)	% FINE THAN 16.0 MM (80172)	% FINE THAN 32.0 MM (80173)
DATE							
APR 24...		36	51	66	80	92	
AUG 16...		97	99	100	--	--	
16...		19	25	37	54	81	
16...		23	29	44	78	100	

05481950 BEAVER CREEK NEAR GRIMES, IA

LOCATION.--Lat 41°41'18", long 93°44'08", in SW1/4 SW1/4 sec.35, T.80 N., R.25 W., Polk County, Hydrologic Unit 07100004, on right bank 6 ft upstream from bridge on Northwest 70th Avenue, 0.5 mi downstream from Little Beaver Creek, 2.5 mi east of Grimes and 6 mi upstream from mouth.

DRAINAGE AREA.--358 mi².

PERIOD OF RECORD.--April 1960 to current year.

REVISED RECORDS.--WDR IA-77-1: 1974 (P).

GAGE.--Water-stage recorder and concrete and steel sheeting broad-crested control. Datum of gage is 806.98 ft above NGVD. Prior to Aug. 31, 1966, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 14 to Jan. 28, Feb. 2-4, 25, Sept. 3-17, and 20-24. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--30 years, 208 ft³/s, 7.89 in/yr, 150,700 acre-ft/yr; median of yearly mean discharges, 200 ft³/s, 7.6 in/yr, 145,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,980 ft³/s June 30, 1986, gage height, 14.73 ft; no flow for several days in 1970 and 1971 and many days in 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 14	0030	1,590	9.86	June 19	0400	*5,580	*14.20
May 22	0130	1,970	10.64	July 14	2330	1,570	9.70
May 27	1100	2,220	10.97	July 31	1115	1,600	9.64

Minimum daily discharge, 0.06 ft³/s Dec. 21-29 and Jan. 4, 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.88	25	4.7	.07	2.5	2.2	133	71	446	583	984	181
2	.66	19	7.7	.07	1.5	2.7	125	66	401	460	614	155
3	.31	18	3.0	.07	.90	3.2	115	63	393	387	491	143
4	.21	17	1.5	.06	.58	3.2	110	74	378	337	424	130
5	7.4	15	2.2	.06	.52	2.8	106	77	358	396	371	115
6	4.4	13	2.9	.07	.56	2.8	99	75	325	510	322	103
7	2.4	11	3.0	.07	1.1	9.3	93	72	295	448	289	94
8	1.7	9.7	2.1	.08	.87	121	91	70	298	359	260	91
9	1.2	9.7	1.5	.08	2.3	318	93	139	290	321	234	85
10	.77	8.6	1.3	1.0	2.4	386	93	857	276	375	360	78
11	.70	8.4	1.8	5.8	1.6	340	88	564	266	572	413	73
12	.46	7.8	.93	3.5	2.3	342	86	355	270	785	312	59
13	.72	7.8	.82	4.2	4.8	910	88	327	281	852	258	70
14	.81	11	.50	2.5	24	1180	94	303	418	1340	218	70
15	1.2	7.9	.35	6.0	11	1230	92	260	583	1290	191	55
16	2.4	6.8	.25	15	6.7	1190	87	431	1660	670	170	65
17	3.2	6.7	.17	10	5.3	790	82	404	2480	475	160	69
18	2.6	5.9	.12	7.0	4.6	506	79	292	4390	392	143	68
19	1.7	4.6	.08	6.0	3.4	375	79	436	5310	401	138	68
20	2.0	6.8	.07	10	2.5	332	87	1110	4010	1010	241	59
21	1.6	5.7	.06	5.0	1.9	308	85	1660	2630	1160	166	49
22	1.4	5.5	.06	4.5	1.4	270	83	1690	2080	741	139	42
23	1.5	3.1	.06	4.4	4.9	226	83	1000	1700	518	125	32
24	1.4	4.2	.06	4.0	6.1	195	83	1170	1430	417	130	33
25	1.8	4.3	.06	4.5	11	183	78	1430	1050	685	647	29
26	1.5	4.4	.06	5.8	2.2	172	73	1780	756	1070	799	28
27	1.5	4.8	.06	4.8	3.0	159	80	2130	605	951	468	28
28	2.9	3.3	.06	5.2	4.8	150	105	1720	668	1110	330	26
29	3.3	3.9	.06	5.7	---	151	89	1010	1070	1470	273	23
30	5.9	3.8	.07	4.4	---	144	79	732	911	1480	266	24
31	20	--	.07	3.9	---	138	---	536	--	1540	216	--
TOTAL	78.52	262.7	35.67	123.83	114.73	10142.2	2758	20904	36028	23105	10152	2145
MEAN	2.53	8.76	1.15	3.99	4.10	327	91.9	674	1201	745	327	71.5
MAX	.20	.25	7.7	.15	.24	1230	133	2130	.5310	1540	984	181
MIN	.21	3.1	.06	.06	.52	2.2	73	63	266	321	125	23
AC-FT	156	521	71	246	228	20120	5470	41460	71460	45830	20140	4250
CFSM	.01	.02	.00	.01	.01	.91	.26	1.88	3.35	2.08	.91	.20
IN.	.01	.03	.00	.01	.01	1.05	.29	2.17	3.74	2.40	1.05	.22

CAL YR 1989	TOTAL	6840.48	MEAN	18.7	MAX	548	MIN	.05	AC-FT	13570	CFSM	.05	IN.	.71
WTR YR 1990	TOTAL	105849.65	MEAN	290	MAX	5310	MIN	.06	AC-FT	210000	CFSM	.81	IN.	11.00

DES MOINES RIVER BASIN

05482135 NORTH RACCOON RIVER NEAR NEWELL, IA

LOCATION.--Lat. 42°36'16", long 95°02'42", in NE1/4 NW1/4 sec.24, T.90 N., R.36 W., Buena Vista County, Hydrologic Unit 07100005, on left bank 40 ft downstream from bridge on State Highway 7, 0.8 mi upstream from Outlet Creek, 2.2 mi west of Newell, and at mile 398.6 upstream from mouth of Des Moines River.

DRAINAGE AREA.--233 mi².

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1235.50 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 22 to Mar. 7, Mar. 16-26, Apr. 8, 9, and May 19-22. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--8 years, 165 ft³/s, 9.62 in/yr, 119,500 acre-ft/yr; median of yearly mean discharge 120 ft³/s, 7.0 in/yr, 86,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,850 ft³/s June 17, 1984, gage height, 16.73 ft, from flood-mark; minimum discharge 0.07 ft³/s Dec. 22-24, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 750 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 2	2245	917	13.31				
June 13	1300	1,130	14.22	June 17	0915	*2,380	*16.33

Minimum daily discharge, 0.07 ft³/s Dec. 22-24.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.7	2.9	.76	.14	1.7	2.7	13	12	138	346	92	11
2	5.1	3.7	.70	.27	1.8	3.3	12	10	387	301	74	14
3	4.3	3.5	.65	.43	1.7	3.5	9.8	6.5	771	267	65	21
4	4.6	3.6	.76	.40	1.7	3.8	9.0	6.4	482	224	54	13
5	5.3	3.4	.88	.54	1.7	4.2	9.0	6.5	394	202	43	10
6	5.3	3.1	.80	.50	1.8	5.4	8.8	6.6	371	180	35	9.3
7	4.4	2.7	.66	.55	1.9	8.6	7.3	6.9	287	165	29	9.2
8	4.0	3.4	.66	.61	2.1	8.5	11	5.9	239	147	26	10
9	4.5	3.8	.78	.68	2.2	12	19	17	197	126	23	10
10	4.0	3.2	.61	.75	2.3	11	20	92	171	116	20	9.4
11	4.4	3.0	.50	.81	2.4	12	22	78	158	106	19	8.4
12	3.9	4.5	.52	.85	2.7	20	17	66	154	107	16	7.6
13	4.1	3.4	.54	.71	2.8	17	16	57	791	101	14	7.2
14	4.1	2.9	.40	.76	2.4	38	15	49	624	91	12	6.8
15	3.8	3.0	.43	.91	2.1	33	16	43	776	83	10	6.2
16	3.9	2.8	.47	1.0	2.2	29	15	91	1770	70	9.4	6.0
17	3.9	2.9	.40	1.0	1.9	24	14	78	2250	61	9.8	5.5
18	4.9	2.5	.33	1.0	1.8	22	12	56	1950	51	9.7	8.2
19	4.7	2.6	.29	.99	1.9	24	12	220	1620	101	7.7	11
20	4.1	2.0	.20	.95	1.9	24	13	175	1830	112	9.3	8.3
21	3.9	2.9	.11	1.1	2.0	23	14	138	1590	99	11	7.1
22	4.1	2.0	.07	1.2	2.2	22	14	150	1220	74	9.0	7.4
23	3.8	1.5	.07	1.4	2.4	22	14	380	958	57	9.5	5.7
24	3.1	1.6	.07	1.4	2.5	21	23	397	742	51	20	5.8
25	3.2	1.1	.08	1.4	2.3	20	31	463	585	58	170	5.6
26	5.1	1.2	.08	1.5	2.3	20	19	520	486	104	68	5.4
27	3.6	1.0	.08	1.5	2.4	19	21	349	417	224	36	5.1
28	3.7	.62	.12	1.7	2.5	20	22	263	590	162	23	4.3
29	2.9	.66	.11	1.6	--	19	17	212	554	196	17	4.4
30	3.0	.70	.10	1.8	--	19	15	180	420	171	14	4.5
31	3.6	--	.12	1.8	--	16	--	152	--	120	12	--
TOTAL	127.0	76.18	12.35	30.25	59.6	527.0	460.9	4286.8	22922	4273	967.4	247.4
MEAN	4.10	2.54	.40	.98	2.13	17.0	15.4	138	764	138	31.2	8.25
MAX	5.3	4.5	.88	1.8	2.8	38	31	520	2250	346	170	21
MIN	2.9	.62	.07	.14	1.7	2.7	7.3	5.9	138	51	7.7	4.3
AC-FT	252	151	24	60	118	1050	914	8500	45470	8480	1920	491
CFSM	.02	.01	.00	.00	.01	.07	.07	.59	3.28	.59	.13	.04
IN.	.02	.01	.00	.00	.01	.08	.07	.68	3.66	.68	.15	.04

CAL YR 1989	TOTAL	8958.93	MEAN	24.5	MAX	404	MIN	.07	AC-FT	17770	CFSM	.11	IN.	1.43
WTR YR 1990	TOTAL	33989.88	MEAN	93.1	MAX	2250	MIN	.07	AC-FT	67420	CFSM	.40	IN.	5.43

DES MOINES RIVER BASIN

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05482170 BIG CEDAR CREEK NEAR VARINA, IA

LOCATION.--Lat. 42°41'16", long 94°47'52", in NE1/4 NE1/4 sec.24, T.91 N., R.34 W., Pocahontas County, Hydrologic Unit 07100006, on left bank 2 ft downstream from bridge on county highway N33, 2.0 mi downstream from Drainage ditch 21, 3.5 mi upstream from Drainage ditch 74, and 5.5 mi northeast of Varina.

DRAINAGE AREA.--80.0 mi².

PERIOD OF RECORD.--October 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,225.12 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 9 to Mar. 26. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--31 years, 41.7 ft³/s, 7.08 in/yr, 30,210 acre-ft/yr; median of yearly mean discharges, 35 ft³/s, 5.9 in/yr, 25,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,080 ft³/s Aug. 31, 1962, gage height, 13.68 ft; maximum gage height, 16.29 ft Mar. 24, 1979, backwater from ice; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 3	0500	482	7.07	June 19	1130	*1,580	*12.09
June 17	0415	1,410	11.50	Aug. 25	0800	538	7.47

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.9	1.3	.25	.00	.06	.16	1.6	5.9	38	123	81	29
2	1.4	1.1	.97	.00	.07	.20	1.3	5.4	87	106	64	26
3	.97	.78	.88	.00	.08	.18	1.1	5.1	407	91	57	25
4	.89	.66	.79	.00	.10	.21	1.1	5.0	244	76	47	20
5	1.1	.58	2.1	.00	.12	.23	.98	4.7	223	67	38	16
6	1.1	.50	2.7	.00	.11	.28	.84	3.6	185	60	33	15
7	.71	.43	1.5	.00	.14	.33	.81	2.6	118	52	29	14
8	.51	.88	.66	.00	.13	.60	.91	2.5	90	45	25	32
9	.38	2.6	1.3	.00	.12	1.3	1.7	18	72	38	21	25
10	.34	1.4	.90	.00	.11	2.1	6.1	45	61	34	19	19
11	.31	1.3	.17	.00	.12	4.3	4.2	32	56	42	16	15
12	.26	.91	.20	.00	.14	6.1	3.5	28	52	135	14	13
13	.27	1.1	.07	.00	.17	9.5	3.6	23	146	93	12	11
14	.27	1.3	.08	.00	.15	14	3.6	19	173	66	11	9.8
15	.53	.83	.09	.00	.12	11	3.3	18	207	52	9.8	9.0
16	.37	.69	.07	.00	.11	9.0	3.1	45	631	41	9.1	8.1
17	.28	.17	.03	.00	.09	8.0	2.9	31	1100	33	11	7.4
18	.23	.09	.02	.02	.10	7.0	2.5	25	626	28	8.7	9.4
19	.23	.12	.00	.03	.09	6.3	2.3	92	1110	79	7.2	12
20	.21	.25	.00	.04	.12	5.1	2.5	91	834	206	17	10
21	.24	.20	.00	.04	.11	3.9	2.3	64	566	114	44	9.9
22	.22	.23	.00	.05	.13	3.7	2.1	51	535	75	30	8.8
23	.24	.43	.00	.04	.12	3.2	2.0	70	479	55	25	7.8
24	.27	.23	.00	.05	.12	2.7	10	73	373	45	33	7.7
25	.27	.28	.00	.04	.11	2.5	8.6	81	298	40	406	7.6
26	.24	.28	.00	.05	.13	2.1	7.0	96	248	100	258	6.6
27	.22	.28	.00	.06	.15	2.0	9.9	75	203	180	154	6.2
28	.23	.07	.00	.05	.13	2.0	9.6	60	188	184	100	5.6
29	2.3	.03	.00	.06	---	2.1	7.6	51	175	287	71	5.3
30	2.2	.03	.00	.05	---	1.7	6.5	45	146	173	53	5.2
31	1.8	---	.00	.08	---	1.8	---	41	---	111	39	---
TOTAL	20.49	19.05	12.78	0.66	3.25	113.59	113.54	1208.8	9671	2831	1742.8	396.4
MEAN	.66	.63	.41	.021	.12	3.66	3.78	39.0	322	91.3	56.2	13.2
MAX	2.3	2.6	2.7	.08	.17	14	10	96	1110	287	406	32
MIN	.21	.03	.00	.00	.06	.16	.81	2.5	38	28	7.2	5.2
AC-FT	41	38	25	1.3	6.4	225	225	2400	19180	5620	3460	786
CFSM	.01	.01	.01	.00	.00	.05	.05	.49	4.03	1.14	.70	.17
IN.	.01	.01	.01	.00	.00	.05	.05	.56	4.50	1.32	.81	.18

CAL YR 1989 TOTAL 2280.94 MEAN 6.25 MAX 146 MIN .00 AC-FT 4520 CFSM .08 IN. 1.06
WTR YR 1990 TOTAL 16133.36 MEAN 44.2 MAX 1110 MIN .00 AC-FT 32000 CFSM .55 IN. 7.50

DES MOINES RIVER BASIN

05482300 NORTH RACCOON RIVER NEAR SAC CITY, IA

LOCATION.--Lat 42°21'16", long 94°59'26", in NW1/4 NW1/4 sec.13, T.87 N., R.36 W., Sac County, Hydrologic Unit 07100006, on right bank 5 ft downstream from bridge on county highway, 2.1 mi upstream from Indian Creek, 0.3 mi upstream from Drainage ditch 73, 4.6 mi south of Sac City, and at mile 367.6 upstream from mouth of Des Moines River.

DRAINAGE AREA.--700 mi².

PERIOD OF RECORD.--June 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,146.03 ft above NGVD. Prior to Oct. 1, 1987 at site 1.7 miles downstream at datum 1.43 ft lower.

REMARKS.--Estimated daily discharges: Nov. 16 to Mar. 6 and Aug. 22-25. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--32 years, 357 ft³/s, 6.80 in/yr, 258,600 acre-ft/yr; median of yearly mean discharges, 280 ft³/s, 5.3 in/yr, 203,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft³/s Mar. 23, 1979, gage height, 18.02 ft, site and datum then in use, maximum gage height, 20.14 ft, June 17, 1990; no flow Jan. 30 to Feb. 4, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1954, reached a stage of 15.61 ft, from floodmark, discharge, 7,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 20	0100	2,890	14.05	June 17	1645	*9,930	*20.14
May 26	1100	2,210	12.77	June 28	2400	3,140	14.41
June 3	1400	2,640	13.68	Aug. 26	1630	4,430	15.77
June 14	0130	3,280	14.60				

Minimum daily discharge, 2.6 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	17	11	3.9	14	19	64	52	658	1460	465	446
2	12	19	12	3.6	15	23	59	45	690	1250	374	359
3	11	17	18	3.8	15	24	51	41	2290	1100	321	353
4	13	17	9.9	4.5	14	25	50	40	1970	969	281	322
5	15	18	11	4.8	15	27	48	38	1530	931	234	243
6	18	17	11	5.1	16	28	45	36	1480	841	197	196
7	17	16	9.2	5.2	17	29	43	35	1180	755	171	165
8	15	16	9.7	5.0	19	31	42	31	983	718	153	315
9	15	15	12	5.3	22	40	46	50	852	635	136	308
10	12	15	8.9	5.1	23	67	70	179	727	578	121	230
11	12	15	7.8	5.0	25	85	114	284	651	537	109	185
12	12	16	7.3	5.0	26	86	112	249	601	547	97	157
13	12	15	6.6	4.5	27	139	104	210	1650	599	87	132
14	11	17	6.2	4.2	24	341	100	184	2940	508	81	118
15	12	16	5.6	4.6	21	275	96	165	2450	455	73	105
16	10	12	4.5	5.1	20	197	87	433	4520	391	63	97
17	12	10	4.2	5.9	17	184	84	557	9150	348	57	90
18	12	9.8	3.9	7.0	15	189	76	375	8090	312	56	96
19	13	12	3.5	7.4	16	168	70	1930	6620	306	53	110
20	16	13	3.1	7.2	17	151	71	2360	6770	812	68	105
21	15	12	2.9	6.8	18	135	69	1520	5730	723	105	103
22	15	13	2.8	7.0	19	130	64	1190	4760	538	205	98
23	15	9.2	2.6	7.4	18	121	62	1300	3870	423	290	98
24	16	12	2.7	8.0	20	108	62	1760	2750	366	600	92
25	14	13	3.0	8.7	21	100	75	1740	2190	347	1500	92
26	15	12	3.5	8.6	19	89	76	1970	1850	425	3210	97
27	13	15	3.8	8.6	18	82	66	1510	1610	984	2300	94
28	16	15	3.9	9.1	18	75	65	1180	2120	923	1370	94
29	18	12	4.4	11	---	72	67	981	2370	938	983	89
30	17	11	5.1	13	---	67	59	840	1740	835	756	85
31	16	---	5.0	14	---	67	---	722	---	604	573	---
TOTAL	433	427.0	205.1	204.4	529	3174	2097	22007	84792	21158	15089	5074
MEAN	14.0	14.2	6.62	6.59	18.9	102	69.9	710	2826	663	487	169
MAX	18	19	.18	14	27	341	114	2360	9150	1460	3210	446
MIN	10	9.2	2.6	3.6	14	19	42	31	601	306	53	85
AC-FT	859	847	407	405	1050	6300	4160	43650	168200	41970	29930	10060
CFSM	.02	.02	.01	.01	.03	.15	.10	1.01	4.04	.98	.70	.24
IN.	.02	.02	.01	.01	.03	.17	.11	1.17	4.51	1.12	.80	.27

CAL YR 1989 TOTAL 25500.6 MEAN 69.9 MAX 1200 MIN 2.6 AC-FT 50580 CFSM .10 IN. 1.36
WTR YR 1990 TOTAL 155189.5 MEAN 425 MAX 9150 MIN 2.6 AC-FT 307800 CFSM .61 IN. 8.25

DES MOINES RIVER BASIN

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05482315 BLACK HAWK LAKE AT LAKE VIEW, IA

LOCATION.--Lat 42°18'15", long 95°02'30", in NW1/4 SE1/4 sec.33, T.87 N., R.36 W., Sac County, Hydrologic Unit 07100006, on south shore across from swimming beach at Lake View and 2 mi upstream from lake outlet.

DRAINAGE AREA.--23.3 mi².

PERIOD OF RECORD.--April 1970 to September 1975, April 1978 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,218.50 ft above NGVD and 2.00 ft below crest of spillway of dam at outlet. Prior to June 25, 1970, nonrecording gage at lake outlet.

REMARKS.--Lake is formed by concrete dam with ungated overflow spillway at elevation 1,220.50 ft above NGVD. Lake is used for conservation and recreation. Area of lake is approximately 957 acres.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 4.08 ft Mar. 20, 1979; minimum, 0.02 ft Sept. 26, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 3.44 ft May 26; minimum, 1.08 ft Mar. 4.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.47	1.31	1.20	1.17	1.17	1.12	1.80	1.78	2.75	2.87	2.53	2.28
2	1.46	1.31	1.20	1.17	1.16	1.12	1.80	1.78	2.70	2.81	2.51	2.30
3	1.45	1.32	1.19	1.17	1.17	1.12	1.81	1.79	2.66	2.73	2.52	2.30
4	1.45	1.31	1.19	1.16	1.17	1.11	1.79	1.79	2.66	2.67	2.49	2.27
5	1.48	1.29	1.18	1.16	1.17	1.13	1.77	1.77	2.64	2.65	2.45	2.26
6	1.46	1.30	1.18	1.16	1.17	1.14	1.77	1.77	2.60	2.62	2.42	2.23
7	1.45	1.30	1.18	1.16	1.17	1.18	1.78	1.76	2.59	2.60	2.40	2.23
8	1.44	1.26	1.19	1.16	1.17	1.22	1.78	1.74	2.58	2.55	2.38	2.21
9	1.44	1.25	1.18	1.16	1.17	1.22	1.80	1.82	2.58	2.55	2.36	2.20
10	1.43	1.27	1.19	1.16	1.17	1.23	1.81	1.84	2.56	2.54	2.35	2.19
11	1.43	1.26	1.20	1.16	1.17	1.26	1.81	1.89	2.54	2.52	2.34	2.17
12	1.42	1.27	1.20	1.15	1.17	1.26	1.82	1.93	2.48	2.47	2.33	2.15
13	1.43	1.25	1.20	1.15	1.17	1.35	1.84	1.95	2.60	2.47	2.31	2.14
14	1.42	1.25	1.19	1.14	1.16	1.47	1.85	1.95	2.70	2.47	2.29	2.08
15	1.41	1.21	1.19	1.14	1.16	1.55	1.86	1.98	2.83	2.45	2.27	2.07
16	1.39	1.20	1.19	1.14	1.17	1.60	1.86	1.98	2.90	2.43	2.27	2.05
17	1.37	1.22	1.18	1.14	1.17	1.62	1.86	1.93	3.11	2.40	2.26	2.05
18	1.36	1.22	1.18	1.14	1.17	1.65	1.88	1.99	3.27	2.38	2.24	2.07
19	1.35	1.21	1.18	1.14	1.16	1.69	1.87	2.34	3.25	2.38	2.23	2.07
20	1.34	1.21	1.18	1.16	1.16	1.72	1.87	2.55	3.14	2.40	2.23	2.07
21	1.34	1.21	1.19	1.18	1.16	1.73	1.87	2.65	3.04	2.39	2.24	2.04
22	1.34	1.20	1.18	1.18	1.16	1.75	1.88	2.66	2.98	2.36	2.24	2.02
23	1.33	1.20	1.18	1.18	1.16	1.76	1.88	2.72	2.97	2.35	2.23	2.00
24	1.33	1.20	1.18	1.18	1.15	1.76	1.87	2.81	2.98	2.35	2.34	1.99
25	1.34	1.19	1.18	1.18	1.15	1.76	1.86	3.17	2.94	2.38	2.38	1.98
26	1.35	1.19	1.18	1.18	1.14	1.78	1.85	3.41	2.87	2.48	2.38	1.98
27	1.32	1.20	1.17	1.18	1.13	1.79	1.83	3.32	2.81	2.54	2.36	1.97
28	1.32	1.21	1.17	1.18	1.13	1.79	1.80	3.16	2.83	2.58	2.35	1.96
29	1.33	1.20	1.17	1.18	---	1.80	1.81	3.02	2.90	2.59	2.33	1.95
30	1.32	1.20	1.17	1.17	---	1.81	1.79	2.91	2.93	2.58	2.32	1.94
31	1.33	---	1.17	1.17	---	1.82	---	2.81	---	2.56	2.30	---
MEAN	1.39	1.24	1.18	1.16	1.16	1.49	1.83	2.29	2.81	2.52	2.34	2.11
MAX	1.48	1.32	1.20	1.18	1.17	1.82	1.88	3.41	3.27	2.87	2.53	2.30
MIN	1.32	1.19	1.17	1.14	1.13	1.11	1.77	1.74	2.48	2.35	2.23	1.94

CAL YR 1989 MEAN 1.88 MAX 2.43 MIN 1.17
WTR YR 1990 MEAN 1.80 MAX 3.41 MIN 1.11

DES MOINES RIVER BASIN

05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IA

LOCATION.--Lat 41°59'17", long 94°22'36", in SW1/4 NW1/4 sec. 20, T.83 N., R.30 W., Greene County, Hydrologic Unit 07100006, on right bank 5 ft downstream from bridge on State Highway 4, 0.1 mi downstream from Drainage ditch 33 and 40, 1.9 mi south of Jefferson, 4.2 mi upstream from Hardin Creek, and at mile 292.5 upstream from mouth of Des Moines River.

DRAINAGE AREA.--1,619 mi².

PERIOD OF RECORD.--March 1940 to current year. Prior to April 1940, monthly discharge only, published in WSP 1308. Prior to October 1955, published as Raccoon River near Jefferson.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1940 (M), 1950-51.

GAGE.--Water-stage recorder. Datum of gage is 967.09 ft above NGVD. Prior to Apr. 22, 1946, nonrecording gage at site 4 mi upstream at different datum. Apr. 22 to June 25, 1946, nonrecording gage, June 26, 1946 to Sept. 30, 1955, water-stage recorder, Oct. 1, 1955 to Apr. 30, 1958, nonrecording gage, at present site and datum.

REMARKS.--Estimated daily discharges: Nov. 20 to Dec. 15, Dec. 21-23, and Jan. 1 to Mar. 6. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--50 years, 740 ft³/s, 6.21 in/yr, 536,100 acre-ft/yr; median of yearly mean discharges, 600 ft³/s, 5.0 in/yr, 435,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,100 ft³/s June 23, 1947, gage height, 22.3 ft; minimum daily discharge, 0.6 ft³/s Oct. 5, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 21	2115	6,160	12.22	June 30	1045	6,250	12.09
May 25	2400	8,370	13.88	Aug. 27	1030	4,440	10.75
June 19	2015	*18,400	*18.61				

Minimum daily discharge, 2.2 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38	133	34	7.8	30	41	188	159	1500	4100	1580	967
2	37	130	32	8.2	31	42	175	149	1350	2970	1300	806
3	31	126	28	9.2	31	45	167	140	1290	2400	1140	680
4	28	124	30	11	30	48	163	145	2540	2050	1050	628
5	51	126	34	12	31	46	151	144	2940	1870	936	587
6	72	131	31	13	33	60	140	140	2140	1640	835	528
7	84	128	26	14	34	137	136	132	2090	1500	756	465
8	79	128	25	15	37	151	137	126	2070	1370	690	423
9	68	134	30	16	37	228	136	163	1840	1380	635	400
10	65	134	24	17	38	260	136	223	1610	1470	592	490
11	65	124	21	19	40	236	139	307	1270	1480	560	449
12	60	108	19	19	45	231	151	467	1080	1540	528	395
13	54	106	17	16	48	238	192	604	2010	1980	500	365
14	58	104	16	17	41	377	225	625	3730	2240	461	337
15	66	108	8.7	20	35	561	225	607	6280	1860	431	318
16	113	77	5.2	22	37	696	215	601	8120	1540	415	295
17	123	46	3.2	22	32	607	213	586	10700	1300	381	268
18	113	39	3.0	22	29	501	196	913	13100	1130	348	283
19	103	85	2.7	21	31	439	190	2860	16500	1120	329	282
20	99	47	2.6	21	30	396	192	4740	16600	1780	341	271
21	99	44	2.3	22	31	359	183	5950	12900	1860	330	280
22	100	41	2.3	25	34	324	181	4630	12600	1670	335	280
23	106	36	2.2	28	35	286	179	3220	12100	1360	349	253
24	111	42	2.5	27	36	264	176	4280	10200	1140	409	236
25	114	43	3.2	27	33	250	165	7710	7830	1110	2550	233
26	110	40	3.6	29	33	233	160	8050	5390	1900	2690	222
27	122	44	4.0	29	34	218	163	6820	4010	2390	4060	218
28	116	38	4.6	31	35	210	183	4650	3870	2410	2460	214
29	110	30	5.7	30	--	201	170	2870	5410	2310	1770	203
30	118	31	6.6	32	--	193	159	2110	5990	2360	1420	200
31	130	--	7.3	31	--	190	--	1730	--	1980	1160	--
TOTAL	2643	2527	436.7	633.2	971	8068	5186	65881	179080	57210	31341	11576
MEAN	85.3	84.2	14.1	20.4	34.7	260	173	2125	5969	1845	1011	386
MAX	130	134	34	32	48	696	225	8060	16600	4100	4060	967
MIN	28	30	2.2	7.8	29	41	136	126	1080	1110	329	200
AC-FT	5240	5010	866	1260	1930	16000	10290	130600	355200	113500	62160	22960
CFSM	.05	.05	.01	.01	.02	:16	.11	1.31	3.69	1.14	.62	.24
IN.	.06	.06	.01	.01	.02	.19	.12	1.51	4.11	1.31	.72	.27

CAL YR 1989	TOTAL	69748.7	MEAN	191	MAX	1610	MIN	2.2	AC-FT	138300	CFSM	.12	IN.	1.60
WTR YR 1990	TOTAL	365512.9	MEAN	1001	MAX	16600	MIN	2.2	AC-FT	725000	CFSM	.62	IN.	8.40

DES MOINES RIVER BASIN

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05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IA

LOCATION.--Lat 42°06'27", long 94°22'12", in SE1/4 SW1/4 sec. 5, T.84 N., R.30 W., Greene County, Hydrologic Unit 07100006, on left bank 35 ft upstream from bridge on county highway E26, 1.6 mi upstream from small left-bank tributary, 4.4 mi upstream from mouth, and 6.5 mi southeast of Churdan.

DRAINAGE AREA.--24.0 mi².

PERIOD OF RECORD.--July 1952 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1708: 1954-55, 1957 (M).

GAGE.--Water-stage recorder. Datum of gage is 1,050.90 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 14 to Mar. 5, June 17, and Aug. 25. Records good except those for estimated daily discharges, which are poor. Small diversion for irrigation upstream from station.

AVERAGE DISCHARGE.--38 years, 10.6 ft³/s, 6.00 in/yr, 7,680 acre-ft/yr; median of yearly mean discharges, 8.3 ft³/s, 4.7 in/yr, 6,010 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 870 ft³/s June 30, 1986 gage height, 10.78 ft, from flood mark; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 150 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 19	0615	305	7.16	July 13	1815	150	5.20
May 25	0615	241	6.53	July 26	1100	406	7.82
June 13	1400	164	5.66	Aug. 25	unknown	249	6.28
June 17	unknown	*754	*10.20				

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	2.1	.06	.00	.14	.35	7.3	2.5	25	39	62	11
2	.00	1.7	.05	.00	.12	.33	6.4	2.5	20	29	48	9.1
3	.00	1.4	.03	.00	.10	.42	6.6	2.5	19	23	35	8.3
4	.12	1.3	.07	.00	.12	.48	6.9	2.5	17	17	27	7.1
5	.75	1.4	.08	.00	.15	.56	6.1	2.3	15	13	21	6.1
6	.90	1.4	.04	.00	.20	1.2	5.8	2.2	10	13	17	5.7
7	1.1	1.4	.03	.00	.18	1.5	5.8	2.4	9.2	10	13	5.0
8	1.7	1.2	.04	.00	.20	6.1	6.0	2.2	10	8.5	11	4.8
9	2.2	1.1	.06	.00	.18	7.2	5.8	4.3	10	6.4	8.4	4.6
10	2.6	1.1	.04	.00	.20	6.1	5.1	13	8.6	5.3	7.0	4.2
11	3.2	1.7	.02	.00	.23	7.6	4.7	11	8.0	7.7	6.2	4.0
12	3.0	1.8	.00	.00	.25	7.5	5.1	14	6.8	11	5.2	3.8
13	2.6	1.6	.00	.00	.27	9.1	5.4	18	97	82	4.5	3.5
14	2.6	1.5	.00	.02	.25	33	5.2	16	86	107	4.0	4.7
15	2.7	1.4	.00	.08	.22	25	5.1	13	120	67	3.4	4.5
16	4.4	.96	.00	1.3	.20	19	5.2	9.8	140	43	2.9	4.1
17	4.7	.07	.00	.09	.10	8.9	4.5	7.1	437	29	2.7	3.6
18	4.9	.08	.00	.10	.13	4.9	4.5	15	218	21	2.2	8.1
19	4.9	.07	.00	.08	.12	3.0	5.2	224	171	15	1.7	10
20	4.5	.09	.00	.07	.17	3.1	4.8	165	152	12	1.6	8.8
21	3.1	.08	.00	.09	.21	3.1	4.3	128	129	62	1.5	8.2
22	2.3	.06	.00	.11	.22	2.8	4.4	90	128	85	1.4	7.3
23	2.1	.04	.00	.14	.18	2.4	4.6	125	132	55	1.3	6.9
24	1.9	.05	.00	.10	.16	3.2	4.4	151	112	41	55	6.0
25	1.8	.06	.00	.09	.15	4.0	4.1	211	92	29	173	5.6
26	1.5	.07	.00	.08	.23	4.2	4.1	166	72	153	103	5.0
27	1.5	.05	.00	.12	.25	5.2	4.0	128	58	146	55	4.8
28	1.8	.03	.00	.10	.23	6.1	3.7	93	55	142	32	3.8
29	1.9	.03	.00	.09	---	6.8	3.3	69	78	114	23	3.5
30	2.6	.05	.00	.08	---	7.8	2.7	51	55	91	28	3.5
31	2.3	---	.00	.10	---	7.8	---	39	---	88	17	---
TOTAL	69.67	23.89	0.52	2.84	5.16	198.74	151.1	1780.3	2490.6	1564.9	774.0	175.6
MEAN	2.25	.80	.017	.092	.18	6.41	5.04	57.4	83.0	50.5	25.0	5.85
MAX	4.9	2.1	.08	1.3	.27	33	7.3	224	437	153	173	11
MIN	.00	.03	.00	.00	.10	.33	2.7	2.2	6.8	5.3	1.3	3.5
AC-FT	138	47	1.0	5.6	10	394	300	3530	4940	3100	1540	348
CFSM	.09	.03	.00	.00	.01	.27	.21	2.39	3.46	2.10	1.04	.24
IN.	.11	.04	.00	.00	.01	.31	.23	2.76	3.86	2.43	1.20	.27

CAL YR 1989 TOTAL 561.47 MEAN 1.54 MAX 65 MIN .00 AC-FT 1110 CFSM .06 IN. .87
WTR YR 1990 TOTAL 7237.32 MEAN 19.8 MAX 437 MIN .00 AC-FT 14360 CFSM .83 IN. 11.22

DES MOINES RIVER BASIN

05483450 MIDDLE RACCOON RIVER NEAR BAYARD, IA

LOCATION.--Lat 41°46'43", long 94°29'33", in SW1/4 SW1/4 sec. 32, T.81 N., R.31 W., Guthrie County, Hydrologic Unit 07100007, on left bank 15 ft downstream from bridge on State Highway 25, 0.2 mi downstream from Battle Run Creek, 1.8 mi upstream from Springbrook Creek, 5.8 mi southeast of Bayard, 10.4 mi upstream from dam at Lake Panorama, and at mile 279.2 upstream from mouth of Des Moines River.

DRAINAGE AREA.--375 mi².

PERIOD OF RECORD.--March 1979 to current year. Occasional low-flow measurements, water years 1976, 1977.

GAGE.--Water-stage recorder. Datum of gage is 1,040.00 ft above NGVD. Prior to June 23, 1979, nonrecording gage on downstream side of State Highway 25 bridge.

REMARKS.--Estimated daily discharges: Nov. 16 to Mar. 4. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. Gage-height telemeter at station.

AVERAGE DISCHARGE.--11 years, 231 ft³/s, 8.36 in./yr 167,400 acre-ft/yr. Median of yearly mean discharges, 220 ft³/s, 8.0 in./yr, 159,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,300 ft³/s June 30, 1986, gage height, 24.70 ft; minimum daily discharge, 5.5 ft³/s, June 13, 14, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 3, 1973 reached a stage of 21.63 ft, from contracted-opening measurement, discharge, 14,600 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 20	0300	5,180	20.20	June 28	2145	2,750	17.65
May 25	1015	3,290	18.35	July 11	0300	1,910	16.21
June 14	0900	4,080	19.19	July 26	1030	1,800	15.95
June 17	1900	*9,570	*23.23	Aug. 25	2215	2,070	16.41
June 23	0545	2,370	17.02				

Minimum daily discharge, 19 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	73	44	24	29	26	167	85	435	638	348	142
2	52	68	41	26	25	30	156	84	405	540	312	128
3	47	67	37	25	26	28	145	86	380	474	297	124
4	47	67	39	23	29	32	149	101	339	414	278	114
5	72	66	44	24	31	32	143	101	305	705	249	106
6	94	62	40	23	28	34	134	92	265	462	228	97
7	68	59	35	26	30	38	130	90	244	385	217	90
8	63	73	33	28	29	169	131	89	260	344	208	85
9	63	66	37	28	27	387	134	323	234	436	198	84
10	61	62	41	31	26	369	141	314	215	863	267	84
11	61	60	30	29	29	277	132	278	204	1370	199	79
12	61	60	27	25	37	285	127	290	198	957	200	74
13	59	59	26	26	30	300	133	324	1380	1000	175	71
14	61	60	25	29	24	787	135	313	2790	734	164	77
15	62	59	24	32	23	843	130	295	2340	552	157	77
16	124	54	24	35	24	797	125	355	4220	452	150	76
17	128	50	25	32	23	675	122	270	7360	382	149	75
18	97	50	23	31	26	554	114	232	7750	332	141	97
19	87	51	22	30	24	466	114	3240	4860	319	130	105
20	84	54	21	29	28	392	117	3820	3540	1290	126	90
21	83	53	21	28	31	363	113	1520	1830	756	123	87
22	80	48	20	29	29	324	108	1050	1490	491	123	81
23	75	48	19	31	32	282	108	909	1880	392	119	76
24	73	51	20	30	27	252	110	1250	1060	328	126	74
25	72	50	22	25	25	236	106	2850	867	315	857	74
26	70	49	22	29	26	220	105	1630	751	1410	896	70
27	67	50	22	27	24	203	98	1070	663	1220	383	67
28	67	40	25	28	25	195	92	811	1410	740	278	66
29	68	34	24	29	---	188	89	659	1500	596	222	65
30	71	37	23	27	---	174	86	561	824	475	186	64
31	77	---	24	30	---	168	---	486	---	400	162	---
TOTAL	2248	1680	880	869	767	9126	3694	23578	49999	19772	7668	2599
MEAN	72.5	56.0	28.4	28.0	27.4	294	123	761	1667	638	247	86.6
MAX	128	73	44	35	37	843	167	3820	7750	1410	896	142
MIN	47	34	19	23	23	26	86	84	198	315	119	64
AC-FT	4460	3330	1750	1720	1520	18100	7330	46770	99170	39220	15210	5160
CFSM	.19	.15	.08	.07	.07	.79	.33	2.03	4.44	1.70	.66	.23
IN.	.22	.17	.09	.09	.08	.91	.37	2.34	4.96	1.96	.76	.26
CAL YR 1989	TOTAL	37194	MEAN	102	MAX	1910	MIN	19	AC-FT	73770	CFSM	.27
WTR YR 1990	TOTAL	122880	MEAN	337	MAX	7750	MIN	19	AC-FT	243700	CFSM	.90
										IN.	3.69	
										IN.	12.19	

DES MOINES RIVER BASIN

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05483470 LAKE PANORAMA AT PANORA, IOWA

LOCATION.--Lat $41^{\circ}41'44''$, long $94^{\circ}22'53''$, in SW1/4 NE1/4 sec.31, T.80 N., R.30 W., Guthrie County, Hydrologic Unit 07100007, in gate control building of dam on Middle Raccoon River, 0.5 mi upstream from State Highway 44, 1.0 mi west of Panora, 4.4 mi upstream from Bay Branch, and at mile 268.8 upstream from mouth of Des Moines River.

DRAINAGE AREA.--433 mi².

PERIOD OF RECORD.--May 1979 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,000.00 ft above NGVD.

REMARKS.--Lake is formed by earthfill dam with 100 ft bascule gate and concrete chute spillway, and 300 ft earthen emergency spillway. Low-flow outlet is 30-inch conduit and gate valve through dam. Dam was completed in August, 1970 and began filling April 27, 1971. Total storage, 60,000 acre-ft, surface area, 2,900 acres, at top of dam, elevation 1,068 ft. Storage unknown at top of spillway, elevation 1,048 ft. Normal storage, 19,700 acre-ft, surface area, 1,270 acres with bascule gate closed, elevation 1,045 ft. Dead storage unknown with bascule gate open, elevation 1,036 ft. Present lake classification is utility (industrial) but is also used for recreation. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 50.10 ft June 30, 1986; minimum, 41.56 ft Oct. 15, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 46.68 ft Mar. 15; minimum recorded, 41.56 ft Oct. 15.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	45.26	42.79	44.22	44.47	44.92	45.02	45.12	45.18	45.50	45.65	45.40	45.49
2	45.23	42.83	44.39	44.49	44.94	45.04	45.05	45.09	45.57	45.46	45.38	45.46
3	45.06	42.87	44.39	44.48	44.92	45.04	44.89	45.14	45.30	45.47	45.40	45.44
4	44.55	42.92	44.32	44.51	44.94	45.04	45.05	45.29	45.44	45.50	45.48	45.50
5	44.07	42.99	44.38	44.52	44.94	45.04	45.26	45.38	45.51	45.30	45.36	45.54
6	43.45	43.02	44.45	44.56	44.99	45.03	45.37	45.42	45.46	45.21	45.39	45.54
7	42.84	43.06	44.46	44.58	45.07	45.08	45.44	45.41	45.29	45.41	45.37	45.54
8	42.41	43.10	44.48	44.61	45.05	45.25	45.49	45.44	45.25	45.37	45.39	45.53
9	42.14	43.15	44.52	44.62	45.04	45.61	45.54	45.60	45.31	45.32	45.48	45.51
10	41.82	43.17	44.58	44.65	45.06	45.91	45.59	45.16	45.23	45.78	45.62	45.28
11	41.65	43.21	44.57	44.64	44.84	45.91	45.58	45.28	45.07	45.72	45.41	44.97
12	41.62	43.26	44.57	44.65	45.02	45.81	45.55	45.34	45.35	45.76	45.32	44.96
13	41.62	43.35	44.57	44.64	45.04	45.90	45.55	45.19	45.68	45.71	45.33	44.99
14	41.62	43.40	44.57	44.64	45.01	46.32	45.49	45.47	45.45	45.64	45.32	45.08
15	41.63	43.48	44.56	44.67	44.98	46.66	45.39	45.61	45.25	45.49	45.43	45.12
16	41.71	43.51	44.54	44.71	45.02	46.63	45.28	45.61	45.46	45.31	45.52	45.17
17	41.85	43.53	44.52	44.77	45.02	46.49	45.30	45.39	45.48	45.15	45.59	45.20
18	42.04	43.58	44.50	44.80	44.99	46.33	45.37	45.21	45.84	45.45	45.61	45.29
19	42.04	43.58	44.50	44.83	44.95	46.15	45.42	45.53	45.22	45.45	45.60	45.38
20	42.11	43.68	44.48	44.85	44.93	46.00	45.49	45.51	44.93	45.51	45.10	45.41
21	42.15	43.74	44.47	44.86	44.95	46.01	45.51	45.07	45.66	45.26	44.85	45.42
22	42.20	43.82	44.47	44.84	44.98	45.96	45.51	45.19	45.51	45.29	44.95	45.40
23	42.24	43.84	44.46	44.83	45.00	45.92	45.52	45.10	45.75	45.23	45.10	45.37
24	42.27	43.87	44.44	44.86	45.02	45.87	45.51	45.26	45.18	45.41	45.31	45.34
25	42.31	43.97	44.43	44.90	45.02	45.83	45.43	45.45	45.24	45.46	45.67	45.35
26	42.33	44.03	44.42	44.89	45.01	45.80	45.25	45.13	45.38	45.66	45.84	45.37
27	42.36	44.12	44.42	44.90	45.03	45.76	45.13	45.11	45.39	45.37	45.76	45.37
28	42.41	44.20	44.42	44.89	45.02	45.71	45.13	45.06	45.45	45.27	45.63	45.36
29	42.49	44.16	44.44	45.04	---	45.67	45.23	45.17	45.46	45.31	45.38	45.35
30	42.63	44.17	44.44	44.89	---	45.61	45.28	45.21	45.70	45.39	45.55	45.34
31	42.71	---	44.46	44.89	---	45.37	---	45.23	---	45.36	45.54	---
MEAN	42.61	43.48	44.47	44.73	44.99	45.73	45.36	45.30	45.41	45.44	45.42	45.34
MAX	45.26	44.20	44.58	45.04	45.07	46.66	45.59	45.61	45.84	45.78	45.84	45.54
MIN	41.62	42.79	44.22	44.47	44.84	45.02	44.89	45.06	44.93	45.15	44.85	44.96

WTR YR 1990 MEAN 44.85 MAX 46.66 MIN 41.62

DES MOINES RIVER BASIN

05483600 MIDDLE RACCOON RIVER AT PANORA, IA

LOCATION.--Lat $41^{\circ}41'14''$, long $94^{\circ}22'15''$, in NE1/4 NW1/4 sec.5, T.79 N., R.30 W., Guthrie County, Hydrologic Unit 07100007, on left bank 15 ft downstream from bridge on county highway, 0.2 mi southwest of Panora, 1.5 mi upstream from Andy's Branch, 1.6 mi downstream from Lake Panorama, 18.2 mi upstream from mouth, and at mile 267.2 upstream from mouth of Des Moines River.

DRAINAGE AREA.--440 mi².

PERIOD OF RECORD.--June 1858 to current year.

REVISED RECORDS.--WDR IOWA 1974: 1973 (P).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 991.20 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 10-25, and Feb. 17-19. Records good except those for estimated daily discharges, which are poor. City of Panora diverts approximately 100 acre-ft/yr upstream of station. Flow regulated by dam on Lake Panorama since August 1970. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--32 years, 224 ft³/s, 6.91 in/yr 162,300 acre-ft/yr; median of yearly mean discharges, 170 ft³/s, 5.2 in/yr, 123,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,300 ft³/s June 30, 1986, gage height, 15.50 ft; no flow June 9, 10, 1977, result of gate operation at Lake Panorama; minimum daily discharge, excluding regulation at Lake Panorama, 3.0 ft³/s July 9, 14, 22-23, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 10, 1953, reached a stage of 14.3 ft, from floodmark, discharge, about 14,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 20	1000	4,520	9.27	June 23	0615	3,190	8.00
May 25	1015	3,530	8.29	June 28	2130	2,880	7.72
June 13	1830	3,900	8.66	July 11	0700	2,520	7.38
June 18	0500	*9,000	*12.77	Aug. 26	0300	3,690	8.46

Minimum daily discharge, 25 ft³/s Nov. 18.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	77	45	31	36	49	51	299	153	226	813	368	146
2	82	44	28	35	48	54	212	93	533	525	347	151
3	215	45	29	34	39	57	150	45	460	392	316	139
4	291	45	30	30	51	57	43	71	219	415	372	97
5	364	44	31	30	49	59	63	98	319	1110	264	106
6	397	44	35	29	51	58	84	101	372	428	239	107
7	297	44	35	30	60	71	99	97	387	347	235	106
8	213	44	35	32	45	113	113	96	284	435	163	103
9	166	43	35	39	50	202	125	693	303	305	157	123
10	161	43	37	52	54	284	147	369	340	869	412	278
11	110	39	36	46	72	387	141	227	241	1620	383	141
12	65	26	35	31	73	344	131	429	85	1390	145	79
13	66	26	36	35	47	457	160	250	1340	1070	229	53
14	60	27	34	40	53	655	185	177	3100	1060	136	35
15	59	27	35	40	48	878	197	334	2100	661	79	36
16	61	26	36	32	44	839	173	519	4750	647	106	40
17	58	26	35	35	44	734	69	373	6390	366	124	43
18	57	25	34	35	42	622	77	169	8000	238	131	56
19	56	26	34	37	45	520	92	2310	4440	432	216	70
20	55	26	33	43	37	408	105	4020	3020	1340	462	75
21	55	27	33	53	43	353	109	1580	1780	1050	132	80
22	55	27	32	65	45	338	112	1100	1460	605	45	81
23	55	27	33	50	49	297	111	926	2290	356	39	72
24	55	26	34	35	53	274	115	985	1210	288	74	67
25	55	26	35	41	49	259	180	2750	694	384	230	67
26	55	28	36	51	49	245	206	1930	733	1420	1460	66
27	52	30	36	40	50	230	149	1250	577	1800	473	67
28	44	33	35	55	50	251	43	725	1360	985	406	69
29	45	32	35	49	---	225	56	703	1440	611	220	66
30	44	32	36	41	---	263	118	421	925	516	125	66
31	42	---	36	39	---	354	---	463	---	426	204	---
TOTAL	3467	1003	1055	1240	1390	9939	3864	23457	49378	22904	8292	2685
MEAN	112	33.4	34.0	40.0	49.6	321	129	757	1646	739	267	89.5
MAX	397	45	37	65	73	878	299	4020	8000	1800	1460	278
MIN	42	25	28	29	37	51	43	45	85	238	39	35
AC-FT	6880	1990	2090	2460	2760	19710	7660	46530	97940	45430	16450	5330
CFSM	.25	.08	.08	.09	.11	.73	.29	1.72	3.74	1.68	.61	.20
IN.	.29	.08	.09	.10	.12	.84	.33	1.98	4.17	1.94	.70	.23

CAL YR 1989 TOTAL 38946 MEAN 107 MAX 1730 MIN 25 AC-FT 77250 CFSM .24 IN. 3.29
WTR YR 1990 TOTAL 128674 MEAN 353 MAX 8000 MIN 25 AC-FT 255200 CFSM .80 IN. 10.88

DES MOINES RIVER BASIN

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05484000 SOUTH RACCOON RIVER AT REDFIELD, IA

LOCATION.--Lat 41°35'22", long 94°09'04", in SW1/4 NE1/4 sec. 2, T.78 N., R.28 W., Dallas County, Hydrologic Unit 07100007, on right bank 20 ft upstream from bridge on county highway at Redfield, 3.2 mi downstream from bridge on U.S. Highway 6, 3.4 mi downstream from Middle Raccoon River, 14.0 mi upstream from mouth, and at mile 245.6 upstream from mouth of Des Moines River.

DRAINAGE AREA.--994 mi².

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1940.

GAGE.--Water-stage recorder. Datum of gage is 876.43 ft above NGVD. Prior to June 12, 1946, nonrecording gage, June 12, 1946 to Sept. 30, 1966, water-stage recorder at site 20 ft upstream at same datum. Sept. 30, 1966, to Sept. 30, 1986 water-stage recorder at site 2.4 mi upstream at datum 20.0 ft higher.

REMARKS.--Estimated daily discharges: Dec. 9 to Mar. 3. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and data collection platform at station.

AVERAGE DISCHARGE.--50 years, 468 ft³/s, 6.39 in/yr, 339,100 acre-ft/yr; median of yearly mean discharges, 410 ft³/s, 5.6 in/yr, 297,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,000 ft³/s July 2, 1958, gage height, 29.04 ft, from flood-mark; minimum daily discharge, 17 ft³/s Aug. 4, 1977 at site 1.5 mi upstream from present site.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 19	1800	6,890	10.92	June 16	2400	19,100	19.05
May 25	1300	6,660	10.73	June 23	1400	5,240	9.69
June 14	0100	6,190	10.32				

Minimum discharge, 40.0 ft³/s Nov. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	161	142	123	88	93	112	508	285	664	1320	807	247
2	152	133	117	90	98	123	407	276	779	1190	668	224
3	190	125	101	92	97	128	365	184	1040	809	662	275
4	357	124	127	97	93	133	264	230	583	836	707	220
5	403	121	132	98	100	131	233	261	601	1870	626	216
6	529	115	122	96	105	123	234	244	642	1450	486	215
7	453	112	86	96	104	168	245	237	653	788	482	211
8	340	112	82	97	111	577	262	230	662	823	388	208
9	277	109	92	99	105	949	270	1060	564	738	353	202
10	288	106	87	108	106	734	292	1540	599	1390	526	309
11	211	105	81	111	113	830	282	733	597	3080	864	365
12	158	97	77	113	122	707	272	801	358	2230	486	170
13	143	85	75	102	131	2450	284	914	1240	1640	394	140
14	136	86	76	98	115	2490	328	636	4970	2100	402	115
15	130	84	73	104	103	2580	335	699	3220	1250	223	104
16	145	75	76	109	112	1990	325	1030	12800	1140	245	103
17	163	56	80	117	100	1540	260	943	17200	979	268	108
18	143	70	78	113	91	1250	219	690	15400	563	273	134
19	135	94	74	108	103	1010	230	3090	10100	746	271	187
20	132	110	69	106	97	837	246	6440	6300	1390	648	186
21	134	104	69	103	97	696	252	3140	3060	2090	411	162
22	132	84	66	109	103	671	249	1910	3990	1030	170	150
23	134	78	64	115	108	569	250	1620	3690	857	129	145
24	132	96	66	114	108	517	263	1550	2680	629	169	129
25	131	105	76	112	105	492	298	4960	1980	664	316	129
26	125	104	73	109	103	471	343	3940	1590	1600	1740	138
27	123	89	75	109	106	443	357	2230	1240	2730	644	152
28	122	82	85	103	107	435	239	1650	2130	1800	574	149
29	117	109	82	100	---	466	195	1390	3050	1480	492	150
30	140	120	84	102	---	444	207	979	1740	1070	191	147
31	154	--	89	97	---	527	---	975	--	869	262	--
TOTAL	6090	3032	2657	3215	2936	24593	8514	44867	104122	41151	14877	5390
MEAN	196	101	85.7	104	105	793	284	1447	3471	1327	480	180
MAX	529	142	132	117	131	2580	508	6440	17200	3080	1740	365
MIN	117	56	64	88	91	112	195	184	358	563	129	103
AC-FT	12080	6010	5270	6380	5820	48780	16890	88990	206500	81620	29510	10690
CFSM	.20	.10	.09	.10	.11	.80	.29	1.46	3.49	1.34	.48	.18
IN.	.23	.11	.10	.12	.11	.92	.32	1.68	3.90	1.54	.56	.20

CAL YR 1989	TOTAL	70392	MEAN	193	MAX	3880	MIN	56	AC-FT	139600	CFSM	.19	IN.	2.63
WTR YR 1990	TOTAL	261444	MEAN	716	MAX	17200	MIN	56	AC-FT	518600	CFSM	.72	IN.	9.78

DES MOINES RIVER BASIN

05484500 RACCOON RIVER AT VAN METER, IA
(National stream-quality accounting network station)

LOCATION.--Lat 41°32'02", long 93°56'59", in SW1/4 SW1/4 sec.22, T.78 N., R.27 W., Dallas County, Hydrologic Unit 07100006, on right bank 10 ft downstream from bridge on county highway R18, 0.3 mi northeast of Van Meter, 0.7 mi upstream from small left bank tributary, 1.1 mi downstream from confluence of North and South Raccoon Rivers, 29.0 mi upstream from mouth, and at mile 230.5 upstream from mouth of Des Moines River.

DRAINAGE AREA.--3,441 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1915 to current year. Prior to October 1934, monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1927 (M), WSP 1438: Drainage area, WSP 1508: 1915 (M), 1925 (M), 1926, 1933 (M), 1939 (M), 1947 (M), 1949 (M).

GAGE.--Water-stage recorder. Datum of gage is 841.16 ft above NGVD. See WSP 1308 for history of changes prior to Aug. 8, 1934.

REMARKS.--Estimated daily discharges: Nov. 23-26 and Nov. 28 to Mar. 4. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and data collection platform and U.S. Weather Service Limited Automatic Remote Collector telemeter at station.

AVERAGE DISCHARGE.--75 years, 1,424 ft³/s, 5.62 in/yr, 1,032,000 acre-ft/yr; median of yearly mean discharges, 1,120 ft³/s, 4.4 in/yr, 811,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 41,200 ft³/s June 13, 1947, gage height, 21.37 ft, from flood-mark; maximum gage height, 22.69 ft July 1, 1986; minimum daily discharge, 10 ft³/s Jan. 22-31, 1940.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 21	0030	11,300	12.27	June 16	1800	*34,600	*21.39
May 28	0445	13,600	13.60				

Minimum daily discharge, 97 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	223	248	160	150	180	180	1220	571	4580	9040	4430	2210
2	202	234	150	155	190	200	1090	584	4010	8120	3740	1840
3	192	218	135	160	185	210	969	523	4140	5330	3260	1610
4	352	219	150	170	175	240	861	542	3600	4740	2870	1430
5	452	218	180	175	190	254	727	597	4730	5040	2570	1260
6	564	206	160	170	200	245	689	572	5210	5240	2200	1170
7	546	198	140	170	195	350	673	551	4470	3920	1930	1070
8	428	195	135	175	210	1310	677	538	4370	3610	1770	980
9	352	195	160	180	195	1780	686	996	3870	3420	1590	897
10	327	187	145	200	195	1710	706	3080	3590	4410	1630	871
11	282	188	130	210	210	2010	697	1900	3380	6170	2210	1020
12	234	183	120	215	230	1830	661	1770	2970	5270	1770	865
13	182	165	115	190	250	4100	679	2110	2780	6600	1420	776
14	183	160	115	180	210	4590	767	1870	8460	6830	1350	685
15	174	156	110	195	180	5230	823	1920	9800	6140	1130	621
16	195	150	115	210	200	4820	831	2330	25300	4950	1030	594
17	208	136	125	230	170	4250	781	2560	32800	4070	1010	560
18	208	142	120	220	150	3680	661	2060	32800	3200	966	552
19	194	147	115	210	175	3040	659	3440	31500	2920	913	586
20	193	162	105	205	160	2570	681	10000	28200	4010	1210	617
21	191	159	105	200	160	2220	674	9840	25700	5750	1250	622
22	188	143	100	215	170	2030	658	9400	24200	5120	887	598
23	187	149	97	230	180	1780	646	9610	20400	4330	784	568
24	183	164	100	230	180	1570	634	8460	17900	3330	811	533
25	180	163	120	225	170	1420	633	10800	15000	3290	1530	512
26	178	163	115	220	165	1330	686	11800	12300	4430	4890	497
27	177	169	120	220	170	1230	713	12700	9250	6570	5190	482
28	189	130	140	205	170	1170	649	13200	9350	6630	5630	469
29	181	110	135	200	---	1210	538	11000	9990	6830	4340	454
30	242	125	140	205	---	1140	527	7170	9060	6300	3110	443
31	256	---	150	190	---	1190	---	5460	---	5450	2600	---
TOTAL	7843	5182	4007	6110	5215	58889	21896	148034	373710	161060	70021	25392
MEAN	253	173	129	197	186	1900	730	4775	12460	5195	2259	846
MAX	564	248	180	230	250	5230	1220	13200	32800	9040	5630	2210
MIN	174	110	97	150	150	180	527	523	2780	2920	784	443
AC-FT	15560	10280	7950	12120	10340	116800	43430	293600	741300	319500	138900	50370
CFSM	.07	.05	.04	.06	.05	.55	.21	1.39	3.62	1.51	.66	.25
IN.	.08	.06	.04	.07	.06	.64	.24	1.60	4.04	1.74	.76	.27

CAL YR 1989 TOTAL 170962 MEAN 468 MAX 4980 MIN 97 AC-FT 339100 CFSM .14 IN. 1.85
WTR YR 1990 TOTAL 887359 MEAN 2431 MAX 32800 MIN 97 AC-FT 1760000 CFSM .71 IN. 9.59

DES MOINES RIVER BASIN

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05484500 RACCOON RIVER AT VAN METER, IA--Continued
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD: Chemical analyses: Partial record station September 1968 to September 1973, February 1974 to September 1979 and October 1986 to current year.

Water temperatures: Partial record station September 1968 to September 1973 and February 1974 to September 1979.

Biological analyses: February 1974 to September 1979.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-	SPE-	DIS-	OXYGEN,	BARO-	COLI-				
		CHARGE, INST. CUBIC FEET	CIFIC DUCT- PER SECOND	CON- (STAND- (US/CM)	PH ANCE (00095)	TEMPER- TURE WATER (00400)	TEMPER- ATURE AIR (DEG C) (00010)	TUR- BID- ITY (NTU) (00020)	OXYGEN, DIS- SOLVED (MG/L) (00076)	METRIC PRES- SURE (MM HG) (00301)	FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
NOV 08...	1430	201	600	8.7	8.0	11.5	2.0	13.7	120	735	590
DEC 13...	1315	114	775	8.4	0.0	-11.0	2.1	15.9	112	743	72
MAR 06...	1100	237	580	8.4	1.5	-0.5	8.6	14.1	102	751	K22
MAY 03...	1030	534	585	8.6	13.5	11.5	18	10.0	98	746	K24
JUN 14...	1500	9220	585	8.2	22.5	28.0	310	7.6	90	742	K210000
AUG 23...	1345	784	568	8.7	25.5	24.0	21	12.2	154	741	430
<hr/>											
DATE	STREP- TOCCOCCI FECAL, KF AGAR (COLS. (MG/L 100 ML) (31673)	HARD- NESS TOTAL PER AS CACO3 (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION SODIUM PERCENT (00932)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00931)	ALKA- LINITY WAT DIS TOT IT FIELD SOLVED (00935)	CAR- BONATE WATER DIS IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	(00453)
NOV 08...	540	290	71	28	19	12	0.5	4.2	231	15	252
DEC 13...	92	360	89	34	28	14	0.6	4.2	285	0	347
MAR 06...	K50	280	68	26	20	13	0.5	3.1	223	6	260
MAY 03...	K47	270	56	31	18	13	0.5	2.6	190	9	215
JUN 14...	K9500	270	72	22	7.9	6	0.2	2.8	204	0	249
AUG 23...	120	280	67	28	12	8	0.3	2.5	217	9	246
<hr/>											
DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (00955)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L AS (70300)	SOLIDS, DIS- SOLVED (TONS (70301)	SOLIDS, DIS- SOLVED (TONS (70302)	NITRO- GEN, NO2+N03 ORGANIC DIS- SOLVED (MG/L AS N) (00605)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
NOV 08...	55	24	0.30	5.0	358	361	0.49	194	0.39	3.30	0.020
DEC 13...	78	39	0.40	7.9	473	475	0.64	146	0.44	5.20	0.021
MAR 06...	49	25	0.30	5.9	342	340	0.47	219	0.55	1.90	0.020
MAY 03...	51	32	0.40	1.3	387	308	0.53	558	1.9	0.200	0.010
JUN 14...	27	21	0.40	16	356	350	0.48	8860	1.0	13.0	0.070
AUG 23...	50	21	1.0	14	350	352	0.48	741	1.7	5.80	0.040

K Results based on colony count outside ideal range.

DES MOINES RIVER BASIN

05484500 RACCOON RIVER AT VAN METER, IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO 1990

DES MOINES RIVER BASIN

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05484800 WALNUT CREEK AT DES MOINES, IA

LOCATION.--Lat 41°35'14", long 93°42'11", in SW1/4 SE1/4 sec.2, T.78 N., R.25 W., Polk County, Hydrologic Unit 07100006, on left bank, 25 ft downstream from bridge on 63rd Street in Des Moines, and 2.2 mi upstream from Raccoon River.

DRAINAGE AREA.--78.4 mi².

PERIOD OF RECORD.--October 1971 to current year.

REVISED RECORDS.--WDR Iowa 1973: 1972. WDR IA-75-1: 1973-74.

GAGE.--Water-stage recorder. Datum of gage is 801.04 ft above NGVD (levels by Iowa Natural Resources Council).

REMARKS.--Estimated daily discharges: Nov. 28 to Dec. 17 and Dec. 23 to Mar. 5. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--19 years, 60.6 ft³/s, 10.5 in/yr, 43,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,500 ft³/s May 10, 1986, gage height, 18.32 ft, from rating curve extended above 3,500 ft³/s on basis of contracted-opening measurement of peak flow; no flow for many days in 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 13	2230	2,070	11.61	June 28	0700	907	8.71
May 25	0315	766	8.19	July 5	0430	628	7.64
June 16	1600	*7,780	*18.00	July 19	1700	1,560	10.76
June 19	1030	1,200	9.68	July 26	0800	652	7.74
June 22	0215	689	7.89	July 27	0530	1,640	10.97

Minimum daily discharge, 0.83 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.9	19	3.9	2.1	3.7	4.2	63	54	82	118	53	12
2	3.1	14	3.7	2.3	4.0	4.7	54	51	84	103	47	11
3	3.9	11	3.8	2.4	3.9	4.9	51	65	74	93	45	11
4	6.6	11	4.2	2.7	3.7	5.2	51	131	68	123	42	9.8
5	71	9.9	5.1	2.9	4.0	5.5	48	85	67	219	35	9.2
6	15	8.6	4.5	2.8	4.3	5.8	45	74	65	125	32	8.4
7	11	6.9	4.0	2.9	4.2	178	44	67	99	99	31	7.8
8	8.1	6.9	3.8	3.0	4.6	336	45	62	137	84	28	15
9	6.7	6.5	4.6	3.1	4.3	235	44	92	69	128	26	7.7
10	7.0	5.9	4.1	3.5	4.3	211	44	63	60	281	43	7.2
11	5.0	5.9	3.7	3.7	4.7	253	40	58	59	231	26	6.7
12	3.6	5.5	3.4	3.8	5.2	195	40	96	128	251	24	6.4
13	3.0	5.5	3.3	3.4	5.6	1050	52	69	138	178	22	6.7
14	3.3	4.9	3.3	3.2	4.8	1060	45	66	300	164	21	6.3
15	3.7	4.6	3.2	3.5	4.4	625	43	85	187	136	20	5.7
16	13	4.3	3.1	3.8	4.8	428	40	90	3610	106	19	5.4
17	4.7	4.9	2.6	4.2	4.2	333	39	77	2270	89	25	5.2
18	3.3	4.7	2.2	4.1	3.7	261	38	68	501	98	18	18
19	3.7	4.5	1.6	3.9	4.0	212	42	93	692	302	75	7.7
20	3.2	4.7	1.4	3.9	3.8	182	52	71	391	197	79	10
21	2.7	4.9	1.0	3.8	3.7	161	39	63	308	116	46	9.5
22	2.4	4.7	.83	4.1	3.9	149	37	61	436	94	32	5.4
23	2.0	4.4	.86	4.4	4.2	111	37	143	267	79	27	4.9
24	2.1	4.1	.88	4.5	4.2	96	35	116	214	68	25	5.4
25	2.2	4.8	1.1	4.4	4.0	86	34	468	182	62	64	4.7
26	2.5	4.5	1.2	4.4	3.8	75	36	230	165	169	36	5.7
27	2.6	4.7	1.4	4.3	3.9	68	151	162	145	268	26	10
28	11	3.6	1.6	4.1	3.9	72	124	132	417	138	21	14
29	9.5	3.1	1.7	4.0	--	83	75	112	190	167	35	19
30	54	3.5	1.8	4.2	--	66	60	96	137	85	21	20
31	19	--	2.0	3.9	--	70	--	86	--	63	13	--
TOTAL	291.8	191.5	83.87	111.3	117.8	6626.3	1548	3186	11542	4434	1057	275.8
MEAN	9.41	6.38	2.71	3.59	4.21	214	51.6	103	385	143	34.1	9.19
MAX	71	19	5.1	4.5	5.6	1060	151	468	3610	302	79	20
MIN	2.0	3.1	.83	2.1	3.7	4.2	34	51	59	62	13	4.7
AC-FT	579	380	166	221	234	13140	3070	6320	22890	8790	2100	547
CFSM	.12	.08	.03	.05	.05	2.73	.66	1.31	4.91	1.82	.43	.12
IN.	.14	.09	.04	.05	.06	3.14	.73	1.51	5.48	2.10	.50	.13

CAL YR 1989 TOTAL 3868.67 MEAN 10.6 MAX 210 MIN .09 AC-FT 7670 CFSM .14 IN. 1.84
WTR YR 1990 TOTAL 29465.37 MEAN 80.7 MAX 3610 MIN .83 AC-FT 58440 CFSM 1.03 IN. 13.98

DES MOINES RIVER BASIN

05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IA

LOCATION.--Lat 41°34'30", long 93°35'48", in NE1/4 SE1/4 sec.10, T.78 N., R.24 W., Polk County, Hydrologic Unit 07100008, on right bank 10 ft downstream from bridge on Southeast 14th Street at Des Moines, 0.8 mi downstream from Raccoon River and Scott Street Dam, and at mile 200.7.

DRAINAGE AREA.--9,879 mi².

PERIOD OF RECORD.--April 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1943 (P).

GAGE.--Water-stage recorder. Datum of gage is 762.52 ft above NGVD. Prior to Oct. 1, 1951, and Oct. 1, 1953, to Sept. 30, 1959, water-stage recorder upstream of Scott Street Dam, 0.8 mi upstream at datum 11.16 ft higher. Oct. 1, 1951, to Sept. 30, 1953, and Oct. 1, 1959 to Sept. 30, 1961, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 14 to Jan. 14, July 31 to Aug. 8 and Sept. 4-11. Records good except those for estimated daily discharges, which are poor. Des Moines municipal water supply is taken from infiltration galleries on Raccoon River, 3.5 mi upstream from station. Average daily pumpage was about 29 ft³/s. At times, water is pumped from Raccoon River into recharge basins, or into Waterworks Reservoir, capacity 4,800 acre-ft. Effluent from sewage treatment plant enters the river 2.3 mi downstream from station. Net effect diversions not known. Flow regulated by Saylorville Lake (station 05481630) 13.0 mi upstream, since Apr. 12, 1977. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

COOPERATION.--Average monthly pumpage from galleries provided by Des Moines Water Works.

AVE'AGE DISCHARGE.--50 years, 4,436 ft³/s, 6.10 in/yr, 3,214,000 acre-ft/yr; median of yearly mean discharges, 3,670 ft³/s, 5.0 in/yr, 2,660,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 77,000 ft³/s June 26, 1947, gage height, 20.8 ft in gage well, 21.6 ft from outside floodmark, site and datum then in use; minimum daily discharge, 26 ft³/s Jan. 16-29, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1893, that of June 26, 1947, site and datum then in use. Flood of May 31, 1903, reached a stage of 20.9 ft, from flood profile, at Scott Street site and datum, by office of Des Moines City Engineer.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 45,200 ft³/s June 19, gage height, 26.95 ft.; minimum daily discharge, 264 ft³/s Feb. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	442	474	327	400	354	371	2510	1720	7780	21700	11200	7500
2	415	453	322	390	342	420	2430	1760	6880	20300	9780	6610
3	402	437	302	380	343	410	2210	1740	6660	15600	9040	5320
4	408	426	334	370	346	437	1930	1860	6420	12400	8640	4460
5	755	426	368	360	336	419	1680	1720	6870	11900	8270	3760
6	736	410	376	350	369	425	1580	1720	8380	12500	7810	3540
7	791	405	287	340	376	708	1520	1660	8460	11000	7360	2580
8	731	395	285	330	400	1950	1450	1630	9150	10100	7200	2250
9	608	394	326	320	405	2310	1450	1770	9020	9750	6700	2100
10	529	388	365	310	402	2650	1440	3160	7930	10300	6630	1950
11	522	388	331	300	423	2840	1420	4690	6410	11300	7140	1900
12	454	380	346	320	422	2700	1410	4230	5850	13100	6980	2100
13	412	379	342	330	502	4710	1440	4600	5710	12100	6480	1910
14	388	352	330	320	357	9480	1530	4880	8940	13100	6250	1790
15	380	337	320	308	264	8120	1760	4710	13500	13000	6060	1680
16	405	321	310	324	274	8100	1900	5070	23900	11200	5780	1540
17	401	299	330	486	348	9600	1880	5920	40400	9870	5710	1430
18	397	266	350	379	422	9010	1780	5300	41100	8920	5610	1360
19	390	282	370	370	422	8070	1740	4570	44100	8890	5720	1300
20	416	341	350	355	397	6720	1820	11800	40300	9600	5730	1320
21	395	359	340	328	387	5230	1760	17300	33300	11100	6010	1330
22	390	378	330	321	385	4690	1690	18000	30300	11100	6150	1270
23	384	325	320	341	371	4260	1530	19300	27900	10000	6430	1230
24	378	310	320	371	362	3630	1530	19200	27000	9040	6330	1160
25	368	346	320	369	360	3110	1520	20700	26800	8510	6910	1050
26	357	362	340	357	377	2740	1530	22200	26100	10200	8550	1020
27	637	367	360	355	384	2640	2110	22100	24100	13000	10900	1010
28	372	322	380	350	362	2560	2510	22200	22700	13100	10600	996
29	402	265	400	345	---	2590	2470	17800	23500	13200	10000	979
30	529	298	420	341	---	2520	2170	12400	22400	13100	8860	971
31	496	---	410	351	---	2450	---	9030	---	12300	7910	---
TOTAL	14690	10886	10611	10871	10492	115870	53700	274740	571860	371280	232740	67416
MEAN	474	363	342	351	375	3738	1790	8863	19060	11980	7508	2247
MAX	791	474	420	486	502	9600	2510	22200	44100	21700	11200	7500
MIN	357	265	285	300	264	371	1410	1630	5710	8510	5610	971
AC-FT	29140	21590	21050	21560	20810	229800	106500	544900	1134000	736400	461600	133700
CFSM	.05	.04	.03	.04	.04	.38	.18	.90	1.93	1.21	.76	.23
IN.	.06	.04	.04	.04	.04	.44	.20	1.03	2.15	1.40	.88	.25

CAL YR 1989 TOTAL 361730 MEAN 991 MAX 7380 MIN 265 AC-FT 717500 CFSM .10 IN. 1.36
WTR YR 1990 TOTAL 1745156 MEAN 4781 MAX 44100 MIN 264 AC-FT 3462000 CFSM .48 IN. 6.57

DES MOINES RIVER BASIN

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05485640 FOURMILE CREEK AT DES MOINES, IA

LOCATION.--Lat 41°36'50", long 93°32'43", in NE1/4 NE1/4 sec.32, T.79 N., R.23 W., Polk County, Hydrologic Unit 07100008, on right bank 20 ft downstream from bridge on Easton Blvd., 4.4 mi downstream from Muchikinock Creek and 5.0 mi upstream from Des Moines River.

DRAINAGE AREA.--92.7 mi².

PERIOD OF RECORD.--October 1971 to current year.

REVISED RECORDS.--WDR IA-75-1: 1974 (P).

GAGE.--Water-stage recorder. Datum of gage is 795.87 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 18, 23, 24, Nov. 28 to Dec. 4, Dec. 6-8, Dec. 11 to Mar. 1, Mar. 9-12, 14-27, Apr. 2-12, Apr. 28 to May 3, May 26 to June 15, June 18, and June 20 to July 2. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--19 years, 73.5 ft³/s, 10.77 in/yr, 53,250 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,340 ft³/s June 9, 1974, gage height, 14.84 ft; no flow for many days in 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 13	1715	1,730	10.76	July 5	0745	587	7.24
May 25	0845	836	8.19	July 12	1315	2,870	12.67
June 16	1445	*4,410	*14.18	July 14	1900	691	7.65
June 19	1000	1,600	10.05	July 19	2045	2,160	11.58
June 22	0330	unknown	unknown	July 27	0915	1,910	11.12
June 28	1200	unknown	unknown				

Minimum daily discharge, 2.6 ft³/s Nov. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.5	14	4.0	4.6	5.4	4.4	66	127	109	169	164	21
2	7.5	14	3.8	4.8	5.6	4.4	60	108	103	151	141	19
3	7.2	12	3.4	5.0	5.5	4.3	58	104	84	128	133	19
4	7.0	11	3.8	5.4	5.1	4.6	56	141	73	109	118	18
5	21	9.5	4.0	5.6	5.6	4.8	54	139	73	307	101	15
6	15	8.6	4.2	5.5	5.8	3.5	52	126	69	168	88	14
7	9.1	7.7	3.6	5.5	5.7	41	50	110	73	134	79	13
8	7.7	6.9	3.5	5.7	6.1	231	51	94	128	111	73	15
9	6.6	6.1	3.5	5.9	5.6	178	49	105	104	120	65	12
10	6.0	5.5	3.5	6.6	5.6	135	47	123	84	135	85	12
11	5.9	5.2	3.4	6.9	6.0	205	44	102	120	160	64	10
12	6.5	4.9	3.2	7.0	6.6	166	42	106	199	1490	55	9.6
13	6.2	4.2	3.1	6.2	7.2	1140	51	109	143	719	49	8.9
14	6.2	4.4	3.1	5.8	5.9	1360	39	110	127	493	45	9.4
15	7.2	5.0	3.0	6.3	5.4	779	36	102	99	385	41	8.1
16	10	3.9	3.1	6.8	6.4	487	35	227	2590	278	36	7.5
17	8.1	6.0	3.5	7.4	5.7	351	32	193	3230	211	40	7.6
18	7.7	7.5	3.3	7.0	5.2	271	29	140	823	176	32	14
19	7.2	4.8	3.2	6.7	5.4	219	34	156	1060	656	37	12
20	7.0	5.4	2.9	6.5	5.0	184	41	172	627	676	86	11
21	6.9	4.4	3.0	6.3	4.6	165	32	125	415	361	71	10
22	7.1	5.3	2.8	6.8	4.8	142	31	105	600	263	54	8.2
23	6.3	6.0	2.8	7.2	5.1	111	31	171	400	201	44	7.5
24	6.7	5.0	2.9	7.2	5.0	98	31	208	290	167	37	7.4
25	7.1	4.5	3.5	7.0	4.8	91	28	588	260	146	88	7.0
26	7.1	4.1	3.4	6.8	4.6	80	29	419	220	183	63	5.6
27	7.1	4.1	3.5	6.8	4.5	74	116	284	207	959	46	5.4
28	8.0	3.1	4.2	6.3	4.4	72	300	218	373	538	35	5.2
29	7.0	2.6	4.1	6.1	--	81	216	176	254	392	35	6.4
30	14	3.0	4.2	6.2	--	71	157	142	196	269	31	6.3
31	14	--	4.6	5.7	--	71	--	122	--	202	24	--
TOTAL	257.9	188.7	108.1	193.6	152.6	6829.0	1897	5152	13133	10457	2060	325.1
MEAN	8.32	6.29	3.49	6.25	5.45	220	63.2	166	438	337	66.5	10.8
MAX	21	14	4.6	7.4	7.2	1360	300	588	3230	1490	164	21
MIN	5.9	2.6	2.8	4.6	4.4	3.5	28	94	69	109	24	5.2
AC-FT	512	374	214	384	303	13550	3760	10220	26050	20740	4090	645
CFSM	.09	.07	.04	.07	.06	2.38	.68	1.79	4.72	3.64	.72	.12
IN.	.10	.08	.04	.08	.06	2.74	.76	2.07	5.27	4.20	.83	.13

CAL YR 1989	TOTAL 4292.44	MEAN 11.8	MAX 293	MIN .86	AC-FT 8510	CFSM 1.13	IN. 1.72
WTR YR 1990	TOTAL 40754.0	MEAN 112	MAX 3230	MIN 2.6	AC-FT 80840	CFSM 1.20	IN. 16.35

DES MOINES RIVER BASIN

05486000 NORTH RIVER NEAR NORWALK, IA

LOCATION.--Lat 41°27'25", long 93°39'10", in NW1/4 SW1/4 sec.20, T.77 N., R.24 W., Warren County, Hydrologic Unit 07100008, on left bank 10 ft downstream from bridge on county highway R57, 1.7 mi southeast of Norwalk, 5.2 mi upstream from Middle Creek, and 6.2 mi downstream from Badger Creek.

DRAINAGE AREA.--349 mi².

PERIOD OF RECORD.--February 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1946. WDR IA-76-1: 1975 (P).

GAGE.--Water-stage recorder. Datum of gage is 788.45 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to June 12, 1946, nonrecording gage at same site and datum. Jan. 7 to Oct. 11, 1960, nonrecording gage at site 2.1 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 18, 24, 25, 28, 29, Dec. 3, 7, Dec. 11 to Mar. 6, and July 10-15. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--50 years, 184 ft³/s, 7.16 in/yr, 133,300 acre-ft/yr; median of yearly mean discharges, 160 ft³/s, 6.2 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,000 ft³/s June 13, 1947, gage height, 25.3 ft, from floodmark, from rating curve extended above 9,100 ft³/s on basis of velocity-area studies; no flow at times during period 1954-58.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 16	0815	2,370	18.61	June 17	0945	*22,600	*25.33
May 26	0515	1,720	16.71	June 27	0915	1,780	16.93

Minimum daily discharge, 4.7 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.7	72	16	8.0	58	32	238	136	235	395	145	16
2	7.9	61	14	8.5	56	31	225	117	222	324	120	13
3	6.6	57	13	9.0	54	30	200	101	208	282	110	12
4	7.4	46	12	9.6	49	29	181	229	195	256	113	12
5	10	39	12	9.2	52	29	173	271	174	670	207	12
6	9.1	35	16	8.8	60	35	161	227	164	597	117	11
7	17	33	14	9.2	70	64	146	183	162	338	82	10
8	31	33	13	10	72	984	140	150	165	268	69	15
9	32	30	15	11	74	1560	138	149	169	226	60	14
10	23	26	15	12	68	1190	140	211	160	400	59	15
11	18	24	12	13	60	1600	139	304	137	560	63	13
12	11	24	9.5	17	56	1200	133	214	125	800	90	10
13	12	22	9.0	35	57	931	126	213	114	660	107	9.5
14	11	20	8.4	41	45	1890	138	212	143	530	70	8.6
15	8.2	20	8.6	37	35	2090	145	201	200	430	57	7.9
16	7.1	19	8.0	34	33	2300	135	201	1310	347	49	7.4
17	10	19	7.0	64	32	1280	129	197	14100	278	44	7.0
18	16	18	6.4	200	31	662	121	174	9080	231	38	7.3
19	17	17	6.0	170	32	496	113	152	4400	212	37	7.8
20	22	18	5.4	160	33	408	120	146	3230	227	53	8.5
21	20	17	5.0	100	31	367	130	147	1400	234	50	8.2
22	19	17	4.7	88	33	345	124	135	1030	215	74	7.0
23	18	17	4.8	80	35	320	111	139	1030	185	49	6.7
24	16	18	5.3	110	39	275	102	150	705	157	42	6.7
25	18	17	6.2	130	37	251	96	1110	592	140	34	6.3
26	17	17	5.6	130	35	239	92	1680	1580	200	30	6.2
27	16	16	7.0	110	34	223	142	877	1630	393	26	5.9
28	17	14	8.4	86	33	211	336	490	893	381	23	5.7
29	16	12	7.4	74	---	233	224	381	990	341	20	5.6
30	30	13	6.8	62	---	256	159	312	484	247	17	5.5
31	67	---	7.2	60	---	247	---	264	---	199	16	---
TOTAL	540.0	791	288.7	1896.3	1304	19608	4557	9473	45027	10723	2071	280.8
MEAN	17.4	26.4	9.31	61.2	46.6	633	152	306	1501	346	66.8	9.36
MAX	67	72	16	200	74	2300	336	1680	14100	800	207	16
MIN	6.6	12	4.7	8.0	31	29	92	101	114	140	16	5.5
AC-FT	1070	1570	573	3760	2590	38890	9040	18790	89310	21270	4110	557
CFSM	.05	.08	.03	.18	.13	1.81	.44	.88	4.30	.99	.19	.03
IN.	.06	.08	.03	.20	.14	2.09	.49	1.01	4.80	1.14	.22	.03

CAL YR 1989	TOTAL 11898.6	MEAN 32.6	MAX 1400	MIN 2.3	AC-FT 23600	CFSM .09	IN. 1.27
WTR YR 1990	TOTAL 96559.8	MEAN 265	MAX 14100	MIN 4.7	AC-FT 191500	CFSM .76	IN. 10.29

DES MOINES RIVER BASIN

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05486490 MIDDLE RIVER NEAR INDIANOLA, IA

LOCATION.--Lat $41^{\circ}25'27''$, long $93^{\circ}35'09''$, in SW1/4 SE1/4 sec.35, T.77 N., R.24 W., Warren County, Hydrologic Unit 07100008, on right bank 10 ft downstream from bridge on county highway, 0.4 mi upstream from Cavitt Creek, 1.5 mi upstream from bridge on U.S. Highway 69, and 4.6 mi northwest of Indianola.

DRAINAGE AREA.--503 mi².

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1940 (M), 1941, 1944, 1946, 1949 (M).

GAGE.--Water-stage recorder. Datum of gage is 776.15 ft above NGVD (U.S. Army Corps of Engineers bench mark). Prior to June 11, 1946, June 9, 1947 to Nov. 23, 1948, and Sept. 8, 1951 to Oct. 30, 1952, nonrecording gage; and June 11, 1946 to June 8, 1947 (destroyed by flood), Nov. 24, 1948 to Sept. 7, 1951, Oct. 31, 1952 to Sept. 30, 1962, water-stage recorder at site 1.6 mi downstream at datum 2.81 ft lower.

REMARKS.--Estimated daily discharges: Nov. 19, 24-27, Nov. 29 to Feb. 12, Feb. 15-20, Feb 24 to Mar. 2, May 23, 24, and Aug. 30. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--50 years, 260 ft³/s, 7.02 in/yr, 188,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 34,000 ft³/s June 13, 1947, gage height, 26.40 ft, from floodmark, former site and datum; 28.27 ft, from floodmark, present site and datum; minimum daily discharge, 0.11 ft³/s July 2, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 25	2245	5,080	17.32	June 17	1200	*12,800	*23.03

Minimum daily discharge, 9.4 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	67	22	12	94	35	229	147	380	595	223	50
2	49	70	24	13	88	32	212	115	349	382	180	58
3	44	79	21	14	84	31	181	101	313	320	356	46
4	42	68	20	14	78	29	155	406	291	320	406	45
5	48	60	18	14	84	28	136	438	272	363	192	42
6	49	57	24	13	92	29	117	293	235	416	177	40
7	45	54	22	14	100	46	100	218	219	343	138	38
8	59	53	21	15	110	1900	90	162	218	255	111	41
9	65	50	22	16	115	1700	85	158	209	208	97	40
10	50	47	23	18	110	1320	88	216	209	413	95	42
11	42	44	22	20	92	1820	81	647	177	674	161	37
12	39	43	20	30	80	1190	70	394	150	1400	466	34
13	37	42	17	47	72	944	65	496	132	727	211	32
14	36	41	16	62	61	2580	78	426	144	628	126	32
15	35	40	15	60	56	3100	90	363	351	497	97	30
16	40	37	16	54	50	2180	79	366	4560	347	84	29
17	38	35	15	150	96	1310	63	338	11800	270	78	29
18	37	28	13	360	94	905	52	275	7640	215	73	30
19	37	31	12	290	96	697	47	234	2120	228	70	30
20	41	34	11	260	100	574	57	207	1470	276	68	29
21	38	33	9.8	220	53	502	64	196	1010	290	105	29
22	35	33	9.4	170	53	453	58	185	1710	344	76	27
23	33	29	9.6	130	46	396	47	200	1400	243	64	30
24	32	31	10	160	40	338	39	500	929	180	62	27
25	33	32	11	190	42	294	32	2850	2020	158	56	25
26	32	31	10	210	41	261	28	2640	2150	174	59	24
27	32	29	11	195	39	237	174	1240	886	1020	52	23
28	32	26	12	165	37	228	624	816	1060	1010	48	22
29	34	22	13	140	---	245	339	630	630	700	45	21
30	54	20	12	115	---	270	205	513	531	453	43	21
31	74	---	12	105	---	251	---	433	---	336	43	---
TOTAL	1314	1266	493.8	3276	2103	23925	3685	16203	43565	13785	4062	1003
MEAN	42.4	42.2	15.9	106	75.1	772	123	523	1452	445	131	33.4
MAX	74	79	24	360	115	3100	624	2850	11800	1400	466	58
MIN	32	20	9.4	12	37	28	28	101	132	158	43	21
AC-FT	2610	2510	979	6500	4170	47460	7310	32140	86410	27340	8060	1990
CFSM	.08	.08	.03	.21	.15	1.53	.24	1.04	2.89	.88	.26	.07
IN.	.10	.09	.04	.24	.16	1.77	.27	1.20	3.22	1.02	.30	.07

CAL YR 1989	TOTAL	24211.1	MEAN	66.3	MAX	3580	MIN	5.2	AC-FT	48020	CFSM	.13	IN.	1.79
WTR YR 1990	TOTAL	114680.8	MEAN	314	MAX	11800	MIN	9.4	AC-FT	227500	CFSM	.62	IN.	8.48

DES MOINES RIVER BASIN

05487470 SOUTH RIVER NEAR ACKWORTH, IA

LOCATION.--Lat 41°20'14", long 93°29'10", in SE1/4 SE1/4 sec.34, T.76 N., R.23 W., Warren County, Hydrologic Unit 07100008, on right bank 15 ft downstream from bridge on county highway, 0.5 mi downstream from Otter Creek, and 2.2 mi southwest of Ackworth.

DRAINAGE AREA.--460 mi².

PERIOD OF RECORD.--February 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1941, 1945 (M), 1946.

GAGE.--Water-stage recorder. Datum of gage is 769.97 ft above NGVD. Prior to June 12, 1946, nonrecording gage, June 13, 1946, to Apr. 13, 1960, water-stage recorder, and Apr. 14, 1960 to Sept. 30, 1961, nonrecording gage, all at site 4.0 mi downstream at datum 8.06 ft lower.

REMARKS.--Estimated daily discharges: Oct. 18 to Nov. 19, Nov. 29 to Feb. 10, Feb. 15 to Mar. 6, June 19-20, July 27-31, and Aug. 12-13. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--50 years, 246 ft³/s, 7.26 in/yr, 178,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,100 ft³/s June 17, 1990, gage height, 31.25 ft; maximum gage height, 32.85 ft July 5, 1981; no flow Sept. 19 to Oct. 13, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1930 reached a stage of 24.5 ft, from information by local residents, discharge, about 30,000 ft³/s, at site 4.0 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 25	1145	12,700	23.12	July 12	1330	7,400	18.82
June 17	1515	*38,100	31.25				

Minimum daily discharge, 1.20 ft³/s Oct. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.5	7.0	2.1	3.1	8.4	3.6	99	254	131	533	228	38
2	2.7	6.2	2.2	3.2	8.2	3.3	80	167	115	276	187	32
3	3.0	5.6	2.0	3.3	8.0	3.1	57	127	88	178	338	36
4	2.7	5.0	1.9	3.4	7.8	2.9	47	900	66	130	1770	33
5	3.1	4.7	1.8	3.6	9.0	3.2	40	1130	59	110	422	29
6	2.8	4.3	2.1	3.8	11	3.4	31	509	59	95	224	29
7	2.3	3.8	1.9	4.1	13	13	24	301	59	86	162	29
8	3.6	3.6	2.0	4.3	15	466	23	184	63	74	132	74
9	2.5	3.5	2.1	5.1	16	719	25	178	54	62	112	71
10	2.3	3.3	2.2	5.6	18	354	33	215	37	541	121	58
11	1.7	3.0	2.1	6.2	20	2370	30	135	24	780	268	30
12	1.4	2.8	2.0	6.8	22	765	23	428	18	3370	1000	23
13	1.2	2.7	1.9	7.6	22	415	26	1430	14	1320	400	19
14	1.3	2.6	1.8	8.0	16	1570	62	557	309	502	153	15
15	1.4	2.5	1.7	7.8	14	2040	75	369	394	390	105	13
16	1.5	2.4	1.8	9.6	11	961	48	533	13200	238	87	11
17	1.7	2.3	1.7	23	9.0	462	38	314	31400	155	80	10
18	1.5	2.3	1.6	28	7.5	299	28	167	4690	108	70	15
19	1.6	2.5	1.5	19	6.0	204	24	136	1500	176	54	19
20	1.7	2.7	1.4	19	5.0	159	42	122	1000	248	385	17
21	1.6	2.6	1.4	14	4.4	146	57	92	780	2160	971	17
22	1.5	2.6	1.3	11	4.0	140	52	77	2220	2650	279	14
23	1.4	2.5	1.4	10	3.9	110	36	90	1050	588	153	10
24	1.4	2.5	1.5	14	4.1	82	28	95	605	333	108	11
25	1.5	2.5	1.7	13	4.2	71	21	6650	427	196	81	9.0
26	1.4	2.4	1.6	12	4.1	66	16	2650	373	222	63	7.4
27	1.4	2.5	1.8	11	4.0	57	511	756	295	2500	51	7.5
28	1.4	2.3	2.0	10	3.8	55	2800	477	714	1700	43	7.2
29	1.6	2.1	2.2	9.5	--	97	843	324	395	1100	37	5.9
30	3.0	2.0	2.5	9.0	--	139	428	227	230	600	40	5.8
31	4.5	--	2.8	8.6	--	117	--	159	--	330	46	--
TOTAL	64.2	96.8	58.0	296.6	279.4	11896.5	5647	19753	60369	21751	8170	695.8
MEAN	2.07	3.23	1.87	9.57	9.98	384	188	637	2012	702	264	23.2
MAX	4.5	7.0	2.8	28	22	2370	2800	6650	31400	3370	1770	74
MIN	1.2	2.0	1.3	3.1	3.8	2.9	16	77	14	62	37	5.8
AC-FT	127	192	115	588	554	23600	11200	39180	119700	43140	16210	1380
CFSM	.00	.01	.00	.02	.02	.83	.41	1.39	4.37	1.53	.57	.05
IN.	.01	.01	.00	.02	.02	.96	.46	1.60	4.88	1.76	.66	.06

CAL YR 1989 TOTAL 5585.59 MEAN 15.3 MAX 1120 MIN .99 AC-FT 11080 CFSM .03 IN. .45
WTR YR 1990 TOTAL 129077.3 MEAN 354 MAX 31400 MIN 1.2 AC-FT 256000 CFSM .77 IN. 10.44

DES MOINES RIVER BASIN

171

05487500 DES MOINES RIVER NEAR RUNNELLS, IA

LOCATION.--Lat 41°29'19", long 93°20'17", in SE1/4 NW1/4 sec.12, T.77 N., R.22 W., Polk County, Hydrologic Unit 07100008, on left bank 10 ft downstream from bridge on State Highway 316, 0.2 mi downstream from South River River, 0.5 mi upstream from Camp Creek, 2.2 mi southeast of Runnels, 37.2 mi upstream from Red Rock Dam and at mi 179.5.

DRAINAGE AREA.--11,655 mi².

PERIOD OF RECORD.--October 1985 to current year.

GAGE.--Water-stage recorder. Datum of gage is 700.00 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Dec. 11 to Feb. 11, Feb. 16-20, June 9-11, 22-29, and July 4-10. Records good except those for estimated daily discharges, which are poor. Flow regulated by Saylorville Lake (station 05481630) 34.2 mi upstream. Stage-discharge relation is affected at times by backwater from Lake Red Rock (05488100). Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--5 years, 5,479 ft³/s, 6.38 in/yr, 3,970,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 88,300 ft³/s June 18, 1990; maximum gage height, 67.02 ft July 2, 1990, (backwater from Lake Red Rock); minimum daily discharge, 390 ft³/s, Jan. 10, 11, 1990.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods occurred on May 31, 1903; June 14, 1947; June 26, 1947; and June 24, 1954. No gage height or discharge was determined. Gage height and discharge information is available for these floods at other sites on the Des Moines River.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 88,300 ft³/s June 18, gage height, 59.42; minimum daily discharge, 390 ft³/s Jan. 10, 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	592	678	441	520	450	477	3100	2830	12300	28300	9840	8920
2	589	664	459	500	440	490	3040	2500	10600	25800	9920	8210
3	574	648	483	480	430	503	2840	2400	9160	23300	9770	6270
4	567	637	552	460	430	504	2520	3090	8640	18000	9900	5640
5	626	616	502	440	440	515	2250	4600	7920	15000	10200	3960
6	888	600	494	430	460	511	2050	3200	9820	16000	10700	3220
7	838	588	467	420	480	541	1950	2720	10200	17000	10600	2720
8	846	578	448	410	500	2500	1840	2450	11200	15500	10100	2180
9	784	560	489	400	520	5870	1800	2370	11300	14000	9580	2310
10	712	546	487	390	540	5450	1820	2830	10300	15000	9020	2180
11	655	539	470	390	560	8760	1780	5790	8240	16100	8550	2090
12	638	528	470	410	587	7230	1750	5390	7270	16000	8360	2190
13	598	518	465	430	605	6750	1730	6930	7280	16600	8070	2110
14	570	509	460	440	586	15600	1840	6400	8540	16200	7530	2000
15	553	504	460	410	452	19700	2010	5850	15700	15800	6930	1910
16	548	488	450	400	430	16600	2140	6080	31300	15200	6570	1750
17	575	460	450	500	490	15400	2140	6950	73800	14200	6120	1660
18	577	439	460	620	560	12900	2060	6940	77600	13100	5610	1560
19	578	441	480	520	540	10900	1960	5480	47400	12000	5230	1540
20	570	456	500	470	520	9390	2070	8690	42700	11400	5170	1480
21	578	482	480	440	508	7150	2060	18500	40300	11100	5800	1550
22	562	496	470	420	501	6080	2010	18800	37000	11200	5840	1480
23	547	490	450	440	499	5540	1840	20000	34000	11400	6500	1420
24	536	455	440	480	490	4750	1750	20700	33000	11100	7110	1310
25	535	458	430	460	489	4040	1710	28500	32000	10400	7970	1160
26	532	477	440	450	487	3510	1690	33900	31000	9660	9270	1080
27	583	489	460	440	506	3260	2440	29500	30000	9520	12600	1040
28	628	485	480	440	496	3150	8480	27700	29000	9930	12400	1030
29	544	427	490	440	---	3210	5270	25200	30000	10200	12400	1020
30	607	456	510	450	---	3240	3650	19300	30900	10200	11200	1020
31	721	---	530	460	---	3140	---	14600	---	9940	9680	---
TOTAL	19251	15712	14667	13960	13996	187661	73590	350190	748470	449150	268540	76010
MEAN	621	524	473	450	500	6054	2453	11300	24950	14490	8663	2534
MAX	888	678	552	620	605	19700	8480	33900	77600	28300	12600	8920
MIN	532	427	430	390	430	477	1690	2370	7270	9520	5170	1020
AC-FT	38180	31160	29090	27690	27760	372200	146000	694600	1485000	890900	532600	150800

CAL YR 1989 TOTAL 428057 MEAN 1173 MAX 13000 MIN 427 AC-FT 849100
WTR YR 1990 TOTAL 2231197 MEAN 6113 MAX 77600 MIN 390 AC-FT 4426000

DES MOINES RIVER BASIN

05487980 WHITE BREAST CREEK NEAR DALLAS, IA

LOCATION.--Lat 41°14'41", long 93°16'08", in NW1/4 NW1/4 sec.3, T.74 N., R.21 W., Marion County, Hydrologic Unit 07100008, on left bank 15 ft downstream from bridge on county highway, 0.5 mi downstream from Kirk Branch, and 1.7 mi northwest of Dallas.

DRAINAGE AREA.--342 mi².

PERIOD OF RECORD.--October 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is 759.21 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 1-13, 15-27, Nov. 21, 22, Nov. 27 to Feb. 10, Feb. 15 to Mar. 7, 13, Apr. 1-3, May 7, 28, 29, June 3, 4, June 24 to July 8, July 24, 25, Aug. 5-7, 11-13, 22, and Sept. 14-16. Records fair except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--28 years, 200 ft³/s, 7.94 in/yr, 144,900 acre-ft/yr; median of yearly mean discharges, 160 ft³/s, 6.4 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,300 ft³/s July 16, 1982, gage height, 33.45 ft; minimum daily discharge, 0.02 ft³/s Oct. 14, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 11, 1962 reached a stage of 28.87 ft, from floodmark, discharge, about 12,000 ft³/s. Flood of June 6, 1947 may have been slightly higher.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 11	0300	4,130	15.89	June 17	0515	*15,400	*25.43
Mar. 14	2300	6,180	(a)18.90	June 19	1600	3,830	14.77
Apr. 28	0545	3,290	15.46	July 21	2145	4,710	16.07
May 4	2045	3,470	15.82	Aug. 4	0315	6,160	18.11
May 25	1215	7,590	21.75				

(a) from floodmark

Minimum daily discharge, 0.02 ft³/s Oct. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.3	5.2	2.0	3.1	9.5	3.1	72	206	97	200	78	19
2	2.0	3.9	2.3	3.6	10	3.0	58	147	85	150	58	18
3	1.8	3.7	2.1	4.7	10	2.8	46	118	73	100	94	18
4	2.0	3.2	1.9	5.5	10	2.6	36	1640	61	70	2470	17
5	2.1	2.6	1.8	5.7	11	5.0	33	1670	50	60	196	17
6	1.4	2.1	2.1	5.8	11	8.0	29	483	46	50	88	16
7	.85	2.6	1.8	6.2	11	10	25	260	44	43	68	15
8	.50	2.0	1.9	6.8	12	77	24	161	57	37	66	15
9	.54	2.0	2.0	8.0	12	154	25	160	48	32	63	191
10	.30	2.5	2.1	10	13	730	27	209	40	79	61	58
11	.17	2.0	2.0	11	13	2420	24	142	29	176	110	25
12	.09	2.5	1.9	12	13	816	22	938	23	865	140	16
13	.05	2.8	1.8	13	14	318	28	1670	19	727	190	12
14	.02	2.1	1.6	15	15	2290	50	537	42	182	151	10
15	.05	2.3	1.6	17	12	2950	40	341	602	102	67	8.2
16	.10	2.3	1.7	19	10	738	35	434	4460	55	49	6.9
17	.25	2.0	1.6	21	8.5	318	31	317	11300	33	43	5.4
18	.50	1.8	1.5	24	7.0	182	25	162	3880	136	38	6.2
19	.70	1.7	1.4	21	6.0	122	23	123	2800	102	31	7.8
20	.60	1.8	1.3	17	5.0	95	30	104	1230	1510	131	7.3
21	.52	1.8	1.3	15	4.3	86	34	85	585	3560	529	7.1
22	.58	1.9	1.3	13	4.0	77	34	75	1850	3500	114	8.6
23	.66	1.9	1.4	12	5.0	66	32	75	928	1030	68	7.9
24	.76	2.1	1.5	14	7.5	54	25	82	362	256	49	9.1
25	.90	2.5	1.7	15	6.5	47	20	4740	230	175	41	3.8
26	1.1	2.7	1.6	13	5.0	43	18	3450	170	316	35	3.4
27	1.4	2.8	1.9	12	4.2	39	294	1490	140	825	30	4.1
28	1.1	2.6	2.3	11	3.5	43	2770	356	210	325	26	4.2
29	1.7	2.3	2.5	10	--	55	1290	217	180	546	23	4.7
30	6.6	2.1	2.6	9.0	--	75	346	153	160	267	21	4.9
31	4.3	--	2.8	9.0	--	81	--	116	--	124	20	--
TOTAL	35.94	73.8	57.3	362.4	253.0	11910.5	5546	20661	29801	15633	5148	546.6
MEAN	1.16	2.46	1.85	11.7	9.04	384	185	666	993	504	166	18.2
MAX	6.6	5.2	2.8	24	15	2950	2770	4740	11300	3560	2470	191
MIN	.02	1.7	1.3	3.1	3.5	2.6	18	75	19	32	20	3.4
AC-FT	71	146	114	719	502	23620	11000	40980	59110	31010	10210	1080
CFSM	.00	.01	.01	.03	.03	1.12	.54	1.95	2.90	1.47	.49	.05
IN.	.00	.01	.01	.04	.03	1.30	.60	2.25	3.24	1.70	.56	.06

CAL YR 1989 TOTAL 6226.60 MEAN 17.1 MAX 2060 MIN .02 AC-FT 12350 CFSM .05 IN. .68
WTR YR 1990 TOTAL 90028.54 MEAN 247 MAX 11300 MIN .02 AC-FT 178600 CFSM .72 IN. 9.79

DES MOINES RIVER BASIN

173

05488100 LAKE RED ROCK NEAR PELLA, IA

LOCATION.--Lat 41°22'11", long 92°58'48", in NE1/4 NW1/4 sec.19, T.76 N., R.18 W., Marion County, Hydrologic Unit 07100008, at outlet works near right end of Red Rock Dam on Des Moines River, 1.4 mi upstream from Lake Creek, 4.5 mi southwest of Pella and at mile 142.3.

DRAINAGE AREA.--12,323 mi².

PERIOD OF RECORD.--March 1969 to current year.

GAGE.--Water-stage recorder. Datum of gage is at NGVD (levels by U.S. Army Corps of Engineers).

REMARKS.--Reservoir is formed by earthfill dam completed in 1969. Storage began in March 1969. Releases controlled through 14 concrete conduits extending through the concrete ogee spillway section into the stilling basin. Inlet invert elevation at 690 ft above NGVD. Maximum design discharge through the conduits is 37,500 ft³/s but normal flood control operation limits maximum outflow to 30,000 ft³/s. Spillway section consists of 5 tainter gates, 41 ft wide and 46 ft high, on concrete ogee crest at elevation 736 ft. The storage capacity of the reservoir at full flood-control pool level, 780 ft, is 1,790,000 acre-ft, surface area, 65,500 acres. Conservation pool level, 728 feet, is 89,000 acre-feet, surface area, 9,980 acres. Reservoir is used for flood control, low-flow augmentation, conservation and recreation. Normal operation will maintain an elevation of 728 ft with minimum release of 300 ft³/s and maximum release of 30,000 ft³/s during the non-growing season, providing discharges at Ottumwa and Keosauqua do not exceed 30,000 ft³/s and 35,000 ft³/s respectively. Storage tables for water years 1985-1986 published as day second-feet instead of acre-feet storage.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 1,765,000 acre-ft June 25, 1984; maximum elevation, 779.61 ft June 25, 1984; minimum daily contents, 43,900 acre-ft May 24, 1985, minimum elevation, 719.68 ft Feb. 17, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 1,030,000 acre-ft June 30 to July 2; maximum elevation, 766.88 ft July 1; minimum daily contents, 137,000 acre-ft May 20; minimum elevation, 734.03 ft May 20.

Capacity table (elevation, in feet, and contents, in acre-feet)

722	45,600	740	256,000	760	789,000
725	63,400	745	357,000	765	983,000
730	110,000	750	479,000	770	1,213,000
735	174,000	755	623,000		

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	151000	157000	154000	153000	172000	168000	168000	140000	323000	1030000	713000	201000
2	149000	156000	154000	153000	172000	168000	164000	140000	307000	1030000	699000	192000
3	149000	156000	153000	153000	173000	168000	163000	140000	286000	1020000	685000	184000
4	149000	156000	153000	154000	173000	168000	161000	145000	264000	1010000	678000	179000
5	151000	156000	154000	154000	173000	166000	159000	150000	245000	992000	671000	173000
6	152000	155000	154000	154000	173000	166000	157000	143000	230000	971000	659000	170000
7	153000	155000	154000	154000	173000	168000	155000	140000	217000	950000	639000	169000
8	153000	155000	153000	154000	173000	173000	154000	139000	206000	929000	617000	167000
9	154000	156000	154000	154000	173000	174000	153000	143000	196000	909000	594000	166000
10	154000	154000	154000	155000	174000	172000	152000	140000	183000	893000	575000	165000
11	154000	153000	154000	155000	174000	180000	149000	143000	167000	879000	556000	164000
12	154000	153000	153000	155000	174000	180000	148000	147000	154000	887000	542000	164000
13	154000	153000	154000	155000	174000	173000	148000	147000	147000	882000	523000	164000
14	154000	154000	154000	155000	173000	180000	147000	151000	141000	870000	502000	164000
15	154000	155000	154000	156000	172000	184000	145000	148000	145000	856000	478000	165000
16	154000	152000	153000	157000	171000	176000	145000	145000	197000	841000	451000	164000
17	153000	154000	153000	158000	169000	163000	143000	140000	375000	820000	427000	165000
18	153000	151000	153000	159000	169000	159000	142000	138000	561000	795000	402000	168000
19	154000	152000	153000	161000	168000	161000	143000	139000	701000	778000	379000	169000
20	154000	152000	153000	162000	168000	167000	144000	137000	795000	765000	355000	170000
21	154000	151000	153000	163000	168000	170000	144000	146000	854000	760000	332000	170000
22	154000	152000	153000	164000	169000	170000	143000	151000	911000	763000	310000	171000
23	154000	152000	153000	165000	170000	168000	142000	154000	944000	756000	289000	170000
24	154000	152000	153000	167000	168000	167000	141000	158000	963000	743000	268000	170000
25	154000	153000	167000	167000	167000	140000	200000	980000	727000	249000	170000	
26	154000	152000	152000	168000	168000	166000	141000	266000	998000	722000	236000	170000
27	155000	154000	152000	169000	168000	163000	141000	316000	1010000	725000	230000	170000
28	156000	153000	152000	170000	167000	163000	141000	346000	1020000	733000	225000	170000
29	157000	153000	153000	170000	---	166000	142000	358000	1030000	735000	221000	170000
30	158000	153000	153000	171000	---	167000	142000	357000	1030000	733000	214000	169000
31	157000	---	153000	171000	---	167000	---	343000	---	725000	207000	---
MEAN	154000	154000	153000	160000	171000	169000	149000	182000	519000	846000	449000	171000
MAX	158000	157000	154000	171000	174000	184000	168000	358000	1030000	1030000	713000	201000
MIN	149000	151000	152000	153000	167000	159000	140000	137000	141000	722000	207000	164000

CAL YR 1989 MEAN 144000 MAX 158000 MIN 135000
WTR YR 1990 MEAN 274000 MAX 1030000 MIN 137000

DES MOINES RIVER BASIN

05488200 ENGLISH CREEK NEAR KNOXVILLE, IA

LOCATION.--Lat 41°16'00", long 93°05'00", in NE1/4 NE1/4 SE1/4 sec.16, T.75 N., R.19 W., Marion County, Hydrologic Unit 07100009, on left bank 30 ft from left upstream abutment of bridge on State Highway 92, 3 mi east of Knoxville, and 11.4 mi upstream from mouth at Des Moines River.

DRAINAGE AREA.--90.1 mi².

PERIOD OF RECORD.--July 1985 to current year.

GAGE.--Water-stage recorder. Datum of gage is 721.79 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 10-13, 22-25, Oct. 27 to Nov. 12, 21, 22, Nov. 24 to Jan. 13, and Jan 23 to Mar. 8. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--5 years, 43.5 ft³/s, 6.56 in./yr, 31,520 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,400 ft³/s June 17, 1990, gage height, 21.83 ft; no flow for several days in 1988 and 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 16, 1982 reached a stage of 30.28 ft, gage datum, discharge 28,000 ft³/s, from contracted-opening indirect computations.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft³/s and maximum (*);

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 11	1945	1,740	20.21	June 17	2030	*2,400	*21.83
Mar. 15	0945	1,390	18.81	June 20	0400	1,360	18.42
Apr. 28	1600	1,090	17.40	June 22	1630	822	15.76
May 5	1045	1,370	18.75	July 21	2045	1,020	17.01
May 13	0545	1,030	17.07	July 29	00045	870	16.26
May 26	0845	2,140	21.19				

Minimum daily discharge, 0.08 ft³/s Sept. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.22	4.0	.94	.94	2.7	2.1	21	43	35	45	20	3.5
2	.15	2.5	.85	1.1	2.8	1.9	17	37	33	40	16	2.0
3	.15	1.8	.78	1.2	2.6	1.7	15	34	29	36	14	1.6
4	.16	1.6	.74	2.0	2.4	1.6	15	452	24	33	178	1.0
5	.21	1.6	.88	2.6	2.8	2.0	14	876	21	31	49	.69
6	.22	1.5	.95	2.2	3.3	3.5	13	148	21	28	20	.97
7	.23	1.9	.78	2.3	4.1	6.0	12	80	21	27	13	1.5
8	.25	1.3	.80	2.5	4.8	16	12	54	25	26	10	2.8
9	.23	1.1	.86	3.5	5.6	21	13	52	25	25	8.4	3.2
10	.21	.95	.90	5.6	6.4	195	14	62	17	41	13	2.3
11	.20	.78	.80	5.2	5.6	1490	14	42	13	129	10	1.4
12	.19	.60	.74	4.5	5.0	259	13	360	11	128	8.3	.26
13	.18	.46	.70	3.5	4.7	102	14	586	9.8	182	7.9	.25
14	.22	.44	.66	3.3	3.7	539	24	120	221	67	8.1	.15
15	.27	.44	.62	2.2	3.2	924	17	72	42	50	6.3	.12
16	.31	.49	.58	3.5	2.7	165	13	65	792	42	4.9	.12
17	1.0	.50	.56	9.9	2.4	75	12	49	1950	31	4.5	.12
18	2.1	.56	.56	11	2.2	49	10	38	1310	44	3.7	.20
19	1.6	.62	.56	6.1	2.0	37	9.7	35	645	191	3.5	.25
20	.89	.77	.54	6.0	1.9	32	12	34	757	439	9.1	.54
21	.87	.90	.54	5.4	1.7	31	14	27	147	711	3.5	.32
22	1.0	.85	.54	5.2	2.0	28	12	25	520	623	2.8	.15
23	1.3	.80	.53	4.7	2.3	24	11	28	187	81	2.6	.09
24	1.5	.90	.58	4.9	2.8	20	9.8	32	94	64	3.2	.09
25	1.4	.95	.64	5.2	3.2	19	8.7	1170	74	34	3.7	.10
26	1.3	1.0	.60	4.6	2.9	18	7.4	1490	65	27	3.6	.09
27	2.0	1.1	.64	3.9	2.6	17	41	145	59	29	1.7	.10
28	1.4	1.0	.70	3.2	2.3	17	829	85	56	75	1.2	.09
29	3.5	.92	.76	2.9	--	24	159	61	93	388	3.7	.08
30	5.0	.86	.80	2.7	--	27	65	48	52	51	7.2	.11
31	7.0	--	.86	2.5	--	23	--	39	--	26	5.4	--
TOTAL	35.26	33.19	21.99	124.34	90.7	4170.8	1441.6	6389	7348.8	3744	446.3	24.19
MEAN	1.14	1.11	.71	4.01	3.24	135	48.1	206	245	121	14.4	.81
MAX	7.0	4.0	.95	11	6.4	1490	829	1490	1950	711	178	3.5
MIN	.15	.44	.53	.94	1.7	1.6	7.4	25	9.8	25	1.2	.08
AC-FT	70	66	44	247	180	8270	2860	12670	14580	7430	885	48
CFSM	.01	.01	.01	.04	.04	1.49	.53	2.29	2.72	1.34	.16	.01
IN.	.01	.01	.01	.05	.04	1.72	.60	2.64	3.03	1.55	.18	.01

CAL YR 1989 TOTAL 2490.26 MEAN 6.82 MAX 1240 MIN .00 AC-FT 4940 CFSM .08 IN. 1.03
WTR YR 1990 TOTAL 23870.17 MEAN 65.4 MAX 1950 MIN .08 AC-FT 47350 CFSM .73 IN. 9.86

DES MOINES RIVER BASIN

175

05488500 DES MOINES RIVER NEAR TRACY, IA

LOCATION.--Lat 41°16'53", long 92°51'34", in NW1/4 SE1/4 sec.19, T.75 N., R.17 W., Mahaska County, Hydrologic Unit 07100009, on right bank 250 ft upstream from abandoned Bellefontaine Bridge, 0.8 mi east of Tracy, 3.1 mi upstream from Cedar Creek, 3.8 mi downstream from bridge on newly located State Highway 92, 6.4 mi downstream from English Creek, and at mile 130.4.

DRAINAGE AREA.--12,479 mi².

PERIOD OF RECORD.--March, 1920 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1920 (M), 1922 (M), 1933.

GAGE.--Water-stage recorder. Datum of gage is 670.91 ft above NGVD. Prior to June 26, 1940, and June 30, 1952, to Nov. 4, 1960, nonrecording gage, and June 27, 1940, to June 29, 1952, water-stage recorder, at site 250 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Dec. 3, 4, 8, 9, Dec. 11 to Jan. 7, Jan 12-14, and June 6, 7, 11-17. Records good except those for periods of estimated daily discharges, which are fair. Flow regulated by Lake Red Rock (station 05488100) 11.9 mi upstream, since March 12, 1969. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers gage-height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--70 years, 5,064 ft³/s, 5.51 in/yr, 3,669,000 acre-ft/yr; median of yearly mean discharges, 4,170 ft³/s, 4.5 in/yr, 3,020,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 155,000 ft³/s, June 14, 1947, gage height, 26.5 ft; minimum daily discharge, 40 ft³/s Jan. 29 to Feb. 1, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1851, that of June 14, 1947. Flood of May 31, 1903, reached a stage of about 25 ft, discharge, about 130,000 ft³/s. Minimum daily discharge since at least 1910, that of Jan. 29 to Feb. 1, 1940.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23,900 ft³/s July 22, gage height 12.98 ft; minimum daily discharge, 350 ft³/s Dec. 20-24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	451	823	397	390	399	636	3760	4890	18100	22400	17900	11700
2	466	815	374	390	397	635	3730	2850	18000	22300	17800	11600
3	446	808	370	390	462	632	3730	2840	17900	22200	17800	10800
4	447	805	365	390	637	634	3720	3190	17500	22200	17900	9070
5	472	815	364	390	657	639	3560	5650	17500	22100	14600	7690
6	458	813	360	390	661	637	3010	6850	16500	22000	13200	5930
7	454	798	371	390	660	642	2850	6120	16000	21900	16600	3690
8	450	816	370	394	663	1260	2650	3270	15400	21800	17300	3610
9	512	824	365	414	661	4360	2640	3010	15300	21700	17200	3570
10	653	825	361	410	661	8360	2630	2530	15200	21700	17100	3180
11	649	752	360	410	662	10000	2620	3510	15100	21800	17000	2590
12	649	624	360	410	715	9710	2500	5620	15000	21900	17000	2440
13	647	627	360	410	914	9280	2300	7060	11000	22000	16900	2330
14	649	620	360	410	1050	12300	2460	7340	10500	21700	16900	2070
15	640	631	355	397	1070	18200	2810	7530	11500	21600	17200	1660
16	645	653	355	399	1050	19300	2810	7930	13000	21500	17300	1640
17	638	580	355	420	1060	18900	2790	8920	14000	21400	18000	1390
18	575	440	355	408	1040	15900	2520	7890	10500	21300	17800	1000
19	436	423	355	408	1020	10300	2110	6450	8270	21600	17700	985
20	437	421	350	411	854	7390	2110	6920	11100	22600	17400	969
21	429	418	350	416	448	6720	2290	9690	14300	23100	17300	1370
22	429	420	350	409	469	6710	2620	14600	16600	20800	17100	1700
23	425	418	350	402	811	6660	2630	16500	16700	16100	17000	1130
24	425	421	350	399	816	5970	2500	17900	18700	16800	16700	1130
25	425	420	360	398	992	4720	2210	19000	22500	17500	15900	1140
26	422	418	360	397	664	4310	1940	15000	22000	17400	14300	1140
27	421	421	370	395	638	4300	2050	8240	22100	17100	13500	1140
28	427	433	370	390	635	3780	5720	10900	22100	16200	13500	1140
29	428	435	380	397	---	2900	10400	17100	22300	17200	13400	1130
30	563	408	380	396	---	3030	8660	18300	22400	16500	13400	1140
31	987	---	390	396	---	3450	---	18200	---	17300	12700	---
TOTAL	16155	18125	11272	12426	20766	202265	98330	275800	487070	633700	505400	100074
MEAN	521	604	364	401	742	6525	3278	8897	16240	20440	16300	3336
MAX	987	825	397	420	1070	19300	10400	19000	22500	23100	18000	11700
MIN	421	408	350	390	397	632	1940	2530	8270	16100	12700	969
AC-FT	32040	35950	22360	24650	41190	401200	195000	547000	966100	1257000	1002000	198500

CAL YR 1989 TOTAL 429429 MEAN 1177 MAX 12600 MIN 350 AC-FT 851800
WTR YR 1990 TOTAL 2381383 MEAN 6524 MAX 23100 MIN 350 AC-FT 4723000

DES MOINES RIVER BASIN

05489000 CEDAR CREEK NEAR BUSSEY, IA

LOCATION.--Lat. 41°13'09", long 92°54'38", at SW corner sec. 11, T. 74 N., R. 18 W., Marion County, Hydrologic Unit 07100009, on left bank 10 ft downstream from bridge on State Highway 156, 0.8 mi downstream from North Cedar Creek, 1.6 mi northwest of Bussey, 3.0 mi upstream from Honey Creek, and 8.9 mi upstream from mouth.

DRAINAGE AREA.--374 mi².

PERIOD OF RECORD.--October 1947 to current year.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 682.15 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to Feb. 21, 1949, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 30 to Dec. 3, Dec. 7 to Jan. 7, Jan. 19-21, 25, 26, Feb. 14 to Mar. 6, and June 22-25. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform and gage-height telemeter at station.

AVERAGE DISCHARGE.--43 years, 215 ft³/s, 7.81 in/yr, 155,800 acre-ft/yr; median of yearly mean discharges, 180 ft³/s, 6.5 in/yr, 130,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 96,000 ft³/s July 3, 1982, gage height, 34.61 ft; no flow Sept. 6-20, 1955, Oct. 11, 12, 1956, Aug. 12, 13, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1946 reached a stage of 28.45 ft on upstream side and 28.05 ft on downstream side of bridge, levels to floodmarks by U.S. Army Corps of Engineers, discharge, 31,500 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 11	1000	4,190	16.09	June 19	2400	4,910	18.15
Mar. 15	0330	5,090	17.66	July 20	2030	5,280	18.63
May 5	0715	6,750	19.89	July 22	0600	5,390	18.78
May 25	2315	11,200	23.75	Aug. 5	0915	5,880	19.38
June 17	1545	*13,000	*24.74				

Minimum daily discharge, 2.1 ft³/s, Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.6	15	3.8	4.2	13	8.0	82	194	177	293	206	38
2	4.8	10	3.5	4.6	13	7.0	62	166	161	198	189	28
3	4.6	7.0	3.2	8.9	13	6.5	57	140	142	135	180	26
4	4.7	6.1	3.9	17	11	6.0	53	2400	119	110	2790	22
5	10	6.2	4.8	15	12	8.0	52	4580	105	93	3800	19
6	11	5.4	5.3	14	13	11	45	791	105	83	269	20
7	11	7.4	3.2	16	16	17	39	432	104	76	160	17
8	8.6	4.3	3.4	17	19	111	37	297	121	70	126	22
9	6.1	3.9	3.6	21	24	229	38	278	111	64	105	130
10	4.3	3.8	3.7	26	25	281	42	373	87	180	94	49
11	3.7	3.5	3.4	29	21	2980	42	262	65	368	139	27
12	3.2	3.3	3.0	26	17	711	36	982	59	330	225	19
13	2.8	3.1	2.8	19	16	467	35	2060	54	493	136	15
14	3.0	3.3	2.7	16	11	1950	64	548	967	201	108	12
15	3.3	3.3	2.5	14	10	3670	81	341	225	143	82	12
16	3.2	3.0	3.0	15	9.0	856	63	1590	902	116	69	9.6
17	3.6	2.7	2.8	28	8.2	382	52	550	10200	93	65	9.2
18	4.1	3.1	2.7	60	7.6	251	44	282	5540	137	63	10
19	4.7	3.1	2.5	37	7.2	183	39	274	1890	624	58	13
20	3.8	3.5	2.4	32	6.8	143	45	246	3470	3420	93	16
21	2.8	3.5	2.3	27	6.0	131	64	135	1110	2260	179	37
22	3.3	3.7	2.2	24	8.0	120	61	150	1700	3600	160	39
23	3.6	3.7	2.1	22	9.0	97	51	150	900	587	81	26
24	4.1	3.8	2.3	24	10	78	47	217	420	350	62	15
25	3.6	4.5	2.5	24	12	71	42	5570	250	283	51	11
26	4.0	4.9	2.3	22	11	68	36	7810	215	245	43	10
27	5.4	4.7	2.5	19	10	63	62	897	170	797	37	9.1
28	3.7	4.4	2.8	15	9.0	60	2600	462	194	387	31	8.6
29	5.4	4.4	3.0	14	--	88	819	319	358	754	30	7.6
30	13	3.5	3.2	14	--	116	271	248	189	390	82	8.6
31	16	--	3.5	12	--	94	--	202	--	246	58	--
TOTAL	171.0	142.1	94.9	636.7	347.8	13263.5	5061	32946	30110	17126	9771	685.7
MEAN	5.52	4.74	3.06	20.5	12.4	428	169	1063	1004	552	315	22.9
MAX	16	15	5.3	60	25	3670	2600	7810	10200	3600	3800	130
MIN	2.8	2.7	2.1	4.2	6.0	6.0	35	135	54	64	30	7.6
AC-FT	339	282	188	1260	690	26310	10040	65350	59720	33970	19380	1360
CFSM	.01	.01	.01	.05	.03	1.14	.45	2.84	2.68	1.48	.84	.06
IN.	.02	.01	.01	.06	.03	1.32	.50	3.28	2.99	1.70	.97	.07

CAL YR 1989 TOTAL 10847.52 MEAN 29.7 MAX 4390 MIN .00 AC-FT 21520 CFSM .08 IN. 1.08
WTR YR 1990 TOTAL 110355.7 MEAN 302 MAX 10200 MIN 2.1 AC-FT 218900 CFSM .81 IN. 10.98

DES MOINES RIVER BASIN

177

05489500 DES MOINES RIVER AT OTTUMWA, IA

LOCATION.--Lat 41°00'39", long 92°24'40", in SE1/4 NE1/4 sec.25, T.72 N., R.14 W., Wapello County, Hydrologic Unit 07100009, on right bank 15 ft downstream from Wabash Railroad Bridge at Ottumwa, 0.4 mi downstream from Ottumwa powerplant, 6.5 mi upstream from Village Creek, 9.5 mi downstream from South Avery Creek, and at mile 94.1.

DRAINAGE AREA.--13,374 mi².

PERIOD OF RECORD.--March 1917 to current year (published as "at Eldon" October 1930 to March 1935). Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 525: 1917-20. WSP 1308: 1917-23 (M), 1925-27 (M), 1931. WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 622.00 ft above NGVD. Prior to Sept. 30, 1930, nonrecording gage at Market Street Bridge 1,700 ft upstream at datum 0.83 ft higher. Oct. 1, 1930, to Mar. 31, 1935, nonrecording gage at Eldon 15 mi downstream at different datum. Apr. 1, 1935, to Oct. 25, 1963, water-stage recorder at site 1,100 ft downstream at Vine Street Bridge at datum 0.77 ft higher.

REMARKS.--Estimated daily discharges: Dec. 14 to Jan. 1. Records good except those for estimated daily discharges, which are poor. Prior to Dec. 12, 1958, and since Nov. 30, 1960, diurnal fluctuation at low and medium stages are caused by powerplant upstream of station about 1/2 mile. Flow regulated by Lake Red Rock (station 05488100) 48.2 mi upstream, since March 12, 1969. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--73 years, 5,492 ft³/s, 5.58 in./yr, 3,979,000 acre-ft/yr; median of yearly mean discharges, 4,690 ft³/s, 4.8 in./yr, 3,400,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 135,000 ft³/s June 7, 1947, gage height, 20.2 ft, site and datum then in use; minimum daily discharge, 30 ft³/s Jan. 27-29, 31, Feb. 2, 3, 5-7, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1850, that of June 7, 1947. Flood of May 31, 1903, reached a stage of 19.4 ft, former site and datum at Vine Street Bridge or about 22 ft at Market Street Bridge, from information by U.S. Army Corps of Engineers and U.S. National Weather Service, discharge, about 140,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 31,700 ft³/s May 25, gage height, 11.26 ft; minimum daily discharge 124 ft³/s Dec. 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	505	1110	597	650	588	665	4190	7120	19000	24700	19400	12300
2	623	752	427	596	531	843	4140	4110	19000	23800	19600	12000
3	487	988	164	532	511	810	4090	3520	18700	23700	19800	11900
4	489	1020	458	800	571	694	4160	7950	18500	23700	20900	10000
5	561	759	716	451	763	740	4120	10900	18100	23600	21900	8500
6	732	1020	549	435	761	885	3660	9100	16600	23600	14800	7090
7	450	839	124	704	806	684	3350	8250	16300	23600	17100	4650
8	535	858	401	426	781	1160	3120	5120	16100	23400	19200	3920
9	512	967	362	421	808	2580	3200	4250	16000	23500	19200	3940
10	786	990	640	821	710	7230	2980	3600	15800	23600	19100	3860
11	503	747	282	428	803	14500	3040	3360	15600	24100	19000	3160
12	784	808	280	622	747	13100	3140	5760	15400	24000	19100	2910
13	751	824	637	604	760	10300	2930	9190	12500	24000	18900	2870
14	713	556	495	517	863	12800	2820	8720	11600	23700	18600	2590
15	762	730	450	414	972	21600	3140	8030	10900	23500	18900	2300
16	813	691	490	644	1320	22100	3270	9210	16400	23300	18800	2010
17	799	739	560	651	1120	20200	3190	9640	28300	23300	19700	1990
18	556	543	520	581	1250	19300	3200	9400	22400	23200	19700	1680
19	644	493	460	710	1290	12700	2880	7280	11300	23600	19500	1400
20	532	475	540	462	1160	8600	2560	6990	15400	25500	19400	1320
21	535	412	470	649	723	7310	2590	8040	15600	27800	19000	1420
22	531	554	560	601	669	6880	2870	12400	18200	27400	19000	2120
23	479	590	490	439	1180	6770	3180	15900	19900	19400	18700	1800
24	567	494	450	478	1080	6740	2960	18000	18200	18200	18500	1510
25	599	427	490	666	716	5500	2950	27200	23600	18800	18100	1490
26	454	424	540	535	1170	4800	2430	26500	23500	19100	16100	1490
27	643	446	470	446	677	4690	2380	13900	23400	20200	14500	1460
28	581	540	510	435	880	4630	4830	9320	23400	19900	14200	1490
29	475	275	600	471	---	3760	11200	15600	23700	20400	14200	1470
30	505	664	560	452	---	3450	10300	19100	23700	19000	14300	1470
31	789	---	540	603	---	3640	---	19300	---	18200	14000	---
TOTAL	18695	20745	14832	17244	24210	229761	112870	326760	548100	703800	563200	116110
MEAN	603	691	478	556	865	7412	3762	10540	18270	22700	18170	3870
MAX	813	1110	716	821	1320	22100	11200	27200	28300	27800	21900	12300
MIN	450	275	124	414	511	665	2380	3360	10900	18200	14000	1320
AC-FT	37080	41150	29420	34200	48020	455700	223900	648100	1087000	1396000	1117000	230300

CAL YR 1989 TOTAL 486959 MEAN 1334 MAX 13100 MIN 124 AC-FT 965900
WTR YR 1990 TOTAL 2696327 MEAN 7387 MAX 28300 MIN 124 AC-FT 5348000

DES MOINES RIVER BASIN

05490500 DES MOINES RIVER AT KEOSAUQUA, IA

LOCATION.--Lat 40°43'40", long 91°57'34", in SE1/4 SW1/4 sec.36, T.69 N., R.10 W., Van Buren County, Hydrologic Unit 07100009, on right bank 10 ft upstream from bridge on State Highway 1 at Keosauqua, 4.0 mi downstream from Chequest Creek, and at mile 51.3.

DRAINAGE AREA.--14,038 mi².

PERIOD OF RECORD.--May 1903 to July 1906, April to December 1910, August 1911 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 525: 1913-20. WSP 1438: Drainage area. WSP 1508: 1903, 1905-6, 1915-18 (M), 1922 (M), 1924-26 (M), 1932-34 (M), 1937, 1942 (M).

CORRECTION.--Erroneous data table published in WDR IA-89.

GAGE.--Water-stage recorder. Datum of gage is 547.36 ft above NGVD. Prior to Dec. 24, 1933, nonrecording gage, and Dec. 25, 1933, to Sept. 30, 1972, water-stage recorder, at same site at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 16 to Jan. 31, and Feb. 16. Records good except those for estimated daily discharges, which are poor. Prior to Dec. 21, 1958, and since Nov. 30, 1960, some diurnal fluctuation at medium and low stages caused by power plant at Ottumwa. Flow regulated by Lake Red Rock (station 05488100) 91.0 mi upstream, since March 12, 1969. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--81 years (water years 1904-05, 1912-90), 5,870 ft³/s, 5.68 in./yr, 4,253,000 acre-ft/yr; median of yearly mean discharges, 4,990 ft³/s, 4.8 in./yr, 3,620,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 146,000 ft³/s June 1, 1903, gage height, 27.85 ft, from flood-mark, datum then in use; minimum daily discharge, 40 ft³/s Jan. 30, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1, 1851, reached a stage of 24 ft, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 48,500 ft³/s June 17, gage height, 22.85 ft; minimum daily discharge, 217 ft³/s Dec. 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	500	444	477	892	1610	760	2730	1500	3360	3030	349	3270
2	486	343	451	829	1960	710	2810	1870	3470	3010	542	1990
3	410	430	411	762	1800	780	2740	1940	4190	3080	373	1460
4	417	417	468	585	553	1100	2670	2310	4480	2430	387	1080
5	318	431	411	849	627	950	2760	2530	3490	1830	513	710
6	342	449	404	976	700	1500	2710	2300	3500	1070	503	631
7	333	442	442	805	600	900	2220	2220	3550	1240	368	474
8	363	424	427	1120	560	950	1840	2130	3460	1170	399	547
9	450	445	371	744	540	900	1330	1670	3430	1050	337	7230
10	380	495	437	841	540	840	652	1220	3400	1040	440	12300
11	364	507	283	621	600	940	640	1240	2960	1000	364	13900
12	800	468	340	967	740	900	633	1220	3130	1100	298	12200
13	966	492	400	1100	800	2820	614	1220	3090	2580	383	7890
14	591	527	350	704	940	5550	626	1210	3190	1350	402	3910
15	725	474	300	761	700	5570	668	1220	2870	1340	363	2680
16	512	545	450	680	600	5610	588	1080	2480	1840	361	1760
17	408	941	425	660	750	2390	740	1270	1840	1620	290	1020
18	401	661	640	680	820	3530	926	997	1310	1690	446	1000
19	448	520	840	740	880	2530	886	1290	1320	1690	255	774
20	363	469	920	680	750	2300	942	1390	1220	1780	469	857
21	404	476	800	620	660	1700	1720	1060	1120	2140	408	912
22	435	425	740	645	620	1280	1640	792	1180	2330	247	928
23	441	456	790	693	700	1810	1160	752	844	1700	467	879
24	426	419	736	643	750	2130	842	830	964	1590	502	787
25	408	407	650	648	730	2110	1010	1650	808	1440	459	853
26	402	555	700	672	710	1940	866	2380	779	1470	513	614
27	399	477	788	649	740	1950	867	3930	1930	1190	341	499
28	410	535	521	628	840	2120	993	6350	2190	916	810	446
29	439	519	428	529	---	2050	961	7410	2310	652	1440	455
30	415	446	569	744	---	1660	1200	5420	2910	1070	1470	460
31	370	---	588	847	---	2250	---	4570	---	638	1870	---
TOTAL	14126	14639	16557	23314	22820	62530	40984	66971	74775	50076	16369	82516
MEAN	456	488	534	752	815	2017	1366	2160	2492	1615	528	2751
MAX	966	941	920	1120	1960	5610	2810	7410	4480	3080	1870	13900
MIN	318	343	283	529	540	710	588	752	779	638	247	446
AC-FT	28020	29040	32840	46240	45260	124000	81290	132800	148300	99330	32470	163700

CAL YR 1988 TOTAL 779558 MEAN 2130 MAX 6550 MIN 283 AC-FT 1546000
WTR YR 1989 TOTAL 485677 MEAN 1331 MAX 13900 MIN 247 AC-FT 963300

DES MOINES RIVER BASIN

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05490500 DES MOINES RIVER AT KEOSAUQUA, IA

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	452	615	392	475	416	705	3820	9820	20500	27400	19400	12600
2	457	1060	533	495	461	676	4270	6330	20300	25400	20000	11400
3	401	821	444	500	421	648	4190	3890	20200	24700	20000	11300
4	463	769	345	475	396	722	4160	5470	19900	24600	20000	10500
5	482	815	327	460	430	702	4130	14900	19400	24500	22200	8930
6	573	852	603	500	618	693	4120	12100	18500	24300	18700	7750
7	530	740	552	495	684	733	3510	8910	18600	24100	14900	6820
8	451	834	371	490	727	774	3340	7940	19700	23800	18500	4560
9	500	800	232	510	735	1220	3090	4850	17600	23900	19100	4210
10	446	790	280	540	721	4210	3140	4380	17300	24200	19100	4240
11	434	786	217	580	623	15200	3010	3680	16900	24400	19000	4140
12	541	808	398	540	684	16900	2950	3910	16700	24800	19100	3330
13	685	685	245	500	664	13200	3010	7800	15100	24700	19500	3180
14	637	590	374	520	859	13900	2910	10100	14100	24600	19000	3050
15	607	642	450	460	1270	24200	2830	8640	12600	24100	19100	2760
16	642	595	400	470	1500	25300	3070	8810	15200	23900	19200	2480
17	707	473	370	540	1120	22900	3270	10100	44300	23600	19400	2140
18	639	615	400	600	1040	22000	3170	9940	35700	23600	20000	2230
19	657	593	470	580	1070	17700	3160	8800	18300	24200	19900	1760
20	603	497	500	540	1080	11600	2700	7280	19700	31900	19800	1460
21	488	454	460	520	975	8230	2510	7230	19300	39700	19500	1650
22	450	356	480	495	921	7500	2500	10100	20000	37100	19400	1490
23	445	371	460	510	841	7190	2750	15900	23000	25800	19200	1970
24	407	360	440	520	1310	7080	3050	18400	20400	19200	19100	1690
25	443	384	465	475	1140	6650	2860	33900	22300	19300	19000	1410
26	386	393	500	430	804	5440	2770	39000	25300	19700	17600	1380
27	472	388	470	460	1080	4870	2410	23300	24700	20900	15600	1380
28	380	399	490	500	979	4820	2570	11400	24700	25000	14400	1400
29	495	298	540	470	---	4680	8950	12900	24700	24300	14200	1390
30	565	352	530	450	---	3640	12100	19500	26200	22000	13900	1370
31	534	---	495	400	---	3490	---	20600	---	18900	13400	---
TOTAL	15972	18135	13233	15500	23569	257573	110320	369880	631200	768600	571200	123770
MEAN	515	604	427	500	842	8309	3677	11930	21040	24790	18430	4126
MAX	707	1060	603	600	1500	25300	12100	39000	44300	39700	22200	12600
MIN	380	298	217	400	396	648	2410	3680	12600	18900	13400	1370
AC-FT	31680	35970	26250	30740	46750	510900	218800	733700	1252000	1525000	1133000	245500

CAL YR 1989 TOTAL 487695 MEAN 1336 MAX 13900 MIN 217 AC-FT 967300
WTR YR 1990 TOTAL 2918952 MEAN 7997 MAX 44300 MIN 217 AC-FT 5790000

MISSOURI RIVER BASIN

BIG SIOUX RIVER BASIN

06483500 ROCK RIVER NEAR ROCK VALLEY, IA

LOCATION.--Lat 43°12'52", long 96°17'39", in SW1/4 SW1/4 sec.16, T.97 N., R.46 W., Sioux County, Hydrologic Unit 10170204, on left bank 3 ft upstream from bridge on county highway K30, 0.3 mi north of Rock Valley and at mile 19.1.

DRAINAGE AREA.--1,592 mi².

PERIOD OF RECORD.--June 1948 to current year.

REVISED RECORDS.--WSP 1439: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,222.54 ft above NGVD. Prior to Aug. 13, 1952, nonrecording gage with supplementary water-stage recorder operating above 6.2 ft gage height. June 4, 1949 to Aug. 12, 1952 and Aug. 13, 1952 to May 4, 1976, water-stage recorder, at site 3.2 mi downstream at datum 10.73 ft lower.

REMARKS.--Estimated daily discharges: Nov. 15-17, Nov. 21 to Mar. 9, and Apr. 6-12. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--42 years, 405 ft³/s, 3.46 in/yr, 293,400 acre-ft/yr; median of yearly mean discharges, 280 ft³/s, 2.4 in/yr, 203,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,400 ft³/s Apr. 7, 1969, gage height, 17.32 ft, site and datum then in use; no flow for many days during winter period in 1959 and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1897 reached a stage of 17.0 ft, former site and datum, discharge not determined, from information by State Highway Commission.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 28	1400	3,360	11.43			No other peak greater than base discharge.	

Minimum daily discharge, 3.6 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	19	35	4.0	10	21	103	96	199	587	135	53
2	20	20	30	4.2	9.0	24	100	104	185	437	129	57
3	18	21	25	4.4	9.4	33	94	114	170	348	119	49
4	18	22	28	4.3	11	35	91	111	162	282	110	45
5	19	26	32	4.1	14	32	86	95	156	249	103	41
6	20	30	29	4.0	18	30	84	84	146	216	90	38
7	18	33	26	4.1	21	32	82	75	137	194	80	36
8	17	33	23	4.3	21	38	80	70	131	175	76	34
9	17	33	27	4.6	19	45	80	91	120	162	70	34
10	17	32	25	5.0	19	55	90	94	111	152	67	33
11	17	31	19	5.6	22	72	86	86	101	143	74	31
12	17	34	14	5.6	27	130	82	88	91	147	66	30
13	16	36	16	5.4	25	175	78	91	87	135	62	29
14	14	33	13	5.7	15	246	73	91	78	125	57	27
15	14	32	10	7.0	14	213	70	97	71	115	53	26
16	15	27	10	9.0	11	196	64	106	453	108	50	24
17	17	29	11	11	10	162	60	113	1350	100	48	26
18	17	30	11	11	10	131	53	162	1160	102	49	28
19	17	30	9.0	10	11	113	51	246	1850	930	240	28
20	18	34	7.0	8.6	11	108	45	270	1400	857	155	27
21	17	32	5.4	7.8	13	99	42	350	787	524	131	25
22	17	28	4.0	8.2	18	101	41	517	664	397	111	22
23	17	29	3.6	9.0	22	105	43	500	565	303	151	20
24	19	33	3.9	9.0	21	145	51	427	484	241	119	20
25	19	35	4.2	8.4	18	176	58	385	413	210	107	19
26	18	38	4.0	8.8	20	165	63	356	360	187	95	17
27	17	27	3.8	11	22	147	66	314	305	165	87	15
28	18	16	4.0	13	20	134	71	303	2150	152	80	15
29	19	15	4.3	14	---	120	79	293	1080	146	73	15
30	18	24	4.5	13	---	112	88	262	839	171	62	15
31	19	---	4.3	11	---	110	---	227	---	155	57	---
TOTAL	546	862	446.0	235.1	461.4	3305	2154	6218	15816	8215	2906	879
MEAN	17.5	28.7	14.4	7.58	16.5	107	71.8	201	527	265	93.7	29.3
MAX	22	38	35	14	27	246	103	517	2160	930	240	57
MIN	14	15	3.6	4.0	9.0	21	41	70	71	100	48	15
AC-FT	1080	1710	885	466	915	6560	4270	12330	31370	16290	5760	1740
CFSM	.01	.02	.01	.00	.01	.07	.05	.13	.33	.17	.06	.02
IN.	.01	.02	.01	.01	.01	.08	.05	.15	.37	.19	.07	.02

CAL YR 1989 TOTAL 41786.6 MEAN 114 MAX 2910 MIN 3.6 AC-FT 82880 CFSM .07 IN. .98
WTR YR 1990 TOTAL 42043.5 MEAN 115 MAX 2160 MIN 3.6 AC-FT 83390 CFSM .07 IN. .98

06485500 BIG SIOUX RIVER AT AKRON, IA
(National stream-quality accounting network station)

LOCATION.--Lat 42°50'14", long 96°33'41", in SW1/4SE1/4SW1/4 sec.30, T.93 N., R.48 W., Plymouth County, on left bank 15 ft downstream from Iowa Highway 403 bridge, 0.5 mi northwest of Akron, and 2.9 mi upstream from Union Creek.

DRAINAGE AREA.--8,424 mi², approximately, of which about 1,487 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1928 to current year.

REVISED RECORDS.--WSP 1309: 1929(M), 1931-33(M), 1936(M), 1938(M), 1940(M). WSP 1389: Drainage area. WDR SD-84-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,118.90 ft above National Geodetic Vertical Datum of 1929. Prior to Dec. 3, 1934, nonrecording gage at bridge 0.5 mi downstream at same datum. From Dec. 3, 1934, to Oct. 31, 1985, water-stage recorder at site 0.6 mi downstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers satellite data-collection platform at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--61 years, 1,030 ft³/s, 746,200 acre-ft/yr; median of yearly mean discharges, 750 ft³/s, 543,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 80,800 ft³/s, Apr. 9, 1969, gage height, 22.99 ft; minimum daily, 4.0 ft³/s, Jan. 17, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 12	1900	(a)*4,100	*15.36			No other peak greater than base discharge.	

(a) Backwater from ice.

Minimum daily discharge, 106 ft³/s, Aug. 20.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	325	173	e150	e140	e180	e120	2490	709	417	412	277	146
2	318	174	e150	e140	e180	e120	2390	716	424	340	247	134
3	280	175	e170	e140	e180	e120	2130	694	371	309	229	130
4	255	190	e180	e140	e180	e120	1720	669	335	279	209	151
5	241	194	e200	e140	e170	e120	1390	639	310	256	277	136
6	233	186	e200	e140	e170	e120	1200	599	302	254	186	126
7	226	191	e190	e140	e170	e120	1060	565	290	239	152	291
8	221	194	e190	e140	e170	e120	1010	541	272	235	142	316
9	221	188	e190	e140	e160	e200	962	514	262	212	129	357
10	212	194	e180	e120	e160	e1000	908	492	248	178	129	342
11	203	190	e180	e120	e160	e2000	849	470	234	166	129	266
12	198	204	e180	e120	e160	e4000	804	447	236	311	116	239
13	196	213	e180	e120	e150	e3500	767	424	215	277	121	216
14	196	220	e170	e120	e150	e3000	730	403	198	232	116	200
15	198	241	e170	e130	e150	e2500	693	388	190	336	127	182
16	197	258	e170	e130	e150	e2000	670	369	191	336	116	169
17	198	250	e170	e130	e140	e1400	633	350	192	454	129	164
18	198	238	e160	e130	e140	e1450	609	346	207	891	131	170
19	192	229	e160	e150	e140	e1500	609	345	205	559	129	155
20	191	220	e160	e150	e140	e1500	582	341	205	551	106	147
21	196	196	e155	e150	e130	e1300	563	356	230	478	109	143
22	193	194	e155	e160	e130	1180	541	355	198	386	129	142
23	192	205	e155	e160	e130	1040	532	347	186	347	218	159
24	188	188	e150	e170	e130	1230	579	346	186	325	136	152
25	189	172	e140	e170	e120	2030	534	324	209	341	141	145
26	188	167	e140	e170	e120	2660	527	601	215	342	173	144
27	190	163	e140	e170	e120	2610	523	1130	229	300	301	139
28	182	169	e140	e180	e120	2640	548	854	260	212	416	136
29	175	169	e140	e190	---	2780	634	630	408	411	260	133
30	175	156	e140	e190	---	2680	689	499	456	358	223	129
31	173	---	e140	e200	---	2670	---	442	---	309	179	---
TOTAL	6540	5901	5115	4590	4200	47830	27876	15905	7881	10636	5482	5459
MEAN	211	197	165	148	150	1543	929	513	263	343	177	182
MAX	325	258	200	200	180	4000	2490	1130	456	891	416	357
MIN	173	156	140	120	120	523	324	186	166	106	126	
AC-FT	12970	11700	10150	9100	8330	94870	55290	31550	15630	21100	10870	10830

CAL YR 1988 TOTAL 221655 MEAN 606 MAX 3010 MIN 98 AC-FT 439700
WTR YR 1989 TOTAL 147415 MEAN 404 MAX 4000 MIN 106 AC-FT 292400

e Estimated

MISSOURI RIVER MAIN STEM

06486000 MISSOURI RIVER AT SIOUX CITY, IA

LOCATION.--Lat. 42°29'09", long 96°24'49", in NW1/4 SE1/4 sec.16 T.29 N., R.9 E., sixth principal meridian, Dakota County, Nebraska, Hydrologic Unit 10230001, on right bank on upstream side of bridge on U.S. Highway 20 and 77 at South Sioux City, Nebraska, 1.9 mi downstream from Big Sioux River, and at mile 732.2.

DRAINAGE.--314,600 mi², approximately. The 3,859 mi² in Great Divide basin are not included.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1897 to current year in reports of the U.S. Geological Survey. Prior to October 1928 and October 1931 to September 1938, monthly discharges only, published in WSP 1310. January 1879 to December 1890, monthly discharges only, in House Document 238, 73rd Congress, 2d session, Missouri River. Gage height records collected in this vicinity September 1878 to December 1899 are contained in reports of Missouri River Commission and since July 1889 are contained in reports of U.S. Weather Bureau.

REVISED RECORDS.--WSP 716: 1929-30. WSP 876: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,056.98 ft above NGVD. Sept. 2, 1878, to Dec. 31, 1905, nonrecording gages at various locations within 1.7 mi of present site and at various datums. Jan. 1, 1906 to Feb. 14, 1935, nonrecording gage, and Feb. 15, 1935 to Sept. 30, 1969, water-stage recorder at site 227 ft downstream at datum 19.98 ft higher, and Oct. 1, 1969 to Sept. 30, 1970 at datum 20.00 ft higher. Oct. 1, 1970 to Jan. 30, 1981, water-stage recorder at site 227 ft downstream at present datum.

REMARKS.--Estimated daily discharges: Dec. 11-14, Dec. 22 to Feb. 8, Feb. 13-16, 18, 19, 24-27, and July 11, 12. Records good except those for estimated daily discharges, which are poor. Flow regulated by upstream main-stem reservoirs. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--93 years, 31,850 ft³/s, 23,075,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 441,000 ft³/s Apr. 14, 1952, gage height, 24.28 ft, datum then in use; minimum, 2,500 ft³/s Dec. 29, 1941; minimum gage height, 7.83 ft Jan. 9, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 40,400 ft³/s, May 19; maximum gage height, 20.77 ft, Dec. 24; minimum daily discharge, 9,200 ft³/s, Nov. 19; minimum gage height, 9.74 ft, Nov. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29300	13100	11700	12100	12300	10900	22600	27100	27800	27100	25500	28700
2	29200	12500	11600	12200	12800	10500	22500	27200	25500	29400	25800	29500
3	29200	12400	11400	12700	11500	10500	23100	25800	29000	28100	26400	30500
4	29200	12800	12600	13000	13000	10500	24000	26700	27000	25100	26700	30600
5	29600	11800	12600	12600	14000	10500	24600	26200	24900	28300	25900	30700
6	29700	11200	11000	12400	13700	10300	24500	26300	28200	27300	26000	31100
7	29800	11100	12000	12300	12600	10600	24200	25700	27000	25500	26200	31200
8	30000	10600	12400	12400	11800	10600	24300	25700	25000	28200	26700	31100
9	29800	10900	13100	12500	12000	10600	24400	26500	28300	27700	27500	31200
10	29800	10500	13200	12700	11600	10700	24500	26100	27000	26700	27800	31300
11	29800	10600	13500	12400	11500	10900	24500	23200	24800	29000	28100	31300
12	29700	10500	14000	12000	11900	10800	24500	23400	28100	28000	27900	31300
13	29800	10600	14500	11600	12000	10500	24900	27300	27000	27400	27900	31300
14	29700	10600	17500	11400	13600	10900	25400	26700	24500	28400	27600	31200
15	29700	10300	16600	12500	14000	10200	25800	24800	28000	27900	27200	31100
16	29800	9720	10500	13000	14500	10100	26300	28600	28700	27000	27100	31100
17	29800	10400	14200	12600	15200	9910	26300	26800	29700	28100	26900	31000
18	29800	9790	16000	12500	14700	9570	26100	24600	30700	27800	26300	31200
19	29800	9200	16900	12400	15500	9550	25600	36700	27800	28500	26700	31400
20	29800	9530	16400	11800	15300	9950	25800	30000	29600	29700	26800	31000
21	29700	9700	15900	11300	13000	10000	25900	23100	28300	28700	26700	30600
22	29700	10100	17000	11200	11600	9880	26200	27200	26900	28700	26700	30100
23	30100	10200	17500	11300	11400	9460	26500	32900	29400	28900	27500	30000
24	30300	10500	16300	11200	11500	9380	26900	28400	27700	28300	28400	29900
25	30500	10700	16200	10900	12200	10400	27200	31200	25000	27600	27900	29900
26	28800	10500	15100	10800	13200	13100	27100	28300	28600	28700	27900	29700
27	26000	10600	15200	10900	13500	15800	27200	25800	28000	26200	27600	29400
28	23200	10200	13600	11300	12300	18500	27600	29300	25800	25600	27700	29600
29	20400	11900	12200	11800	--	21100	27300	27600	31200	27100	27900	30000
30	17700	13300	12200	12500	--	22200	27400	25300	31100	26500	28000	29600
31	14700	--	12200	13000	--	22300	--	28900	--	26000	28200	--
TOTAL	874400	325840	435100	373300	362000	370200	763300	844400	830600	857500	841500	916700
MEAN	28210	10860	14040	12040	12930	11940	25440	27240	27690	27660	27150	30560
MAX	30500	13300	17500	13000	15500	22300	27600	36700	31200	29700	28400	31400
MIN	14700	9200	10500	10800	11400	9380	22500	23100	24500	25100	25500	28700
AC-FT	1734000	646300	863000	740400	718000	734300	1514000	1675000	1647000	1701000	1669000	1818000

CAL YR 1989 TOTAL 8627000 MEAN 23640 MAX 33500 MIN 5060 AC-FT 17110000
WTR YR 1990 TOTAL 7794840 MEAN 21360 MAX 36700 MIN 9200 AC-FT 15460000

MISSOURI RIVER MAIN STEM

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06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

WATER-QUALITY RECORDS

LOCATION.--Samples for particle-size distribution were collected from boat cross-section 0.2 mile downstream from gage.

PERIOD OF RECORD.--Water years 1972 to current year. Daily sediment loads October 1954 to September 1971 in reports of U.S. Army Corps of Engineers.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1972 to September 1976, November 1977 to September 1981.

WATER TEMPERATURES: October 1971 to September 1976, November 1977 to September 1981.

SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1976.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 950 microsiemens June 17, 19, 1981; minimum daily, 410 microsiemens Mar. 22, 1978.

WATER TEMPERATURES: Maximum daily, °C July 30, 1976 and Aug. 7, 1979; minimum daily, 0.0°C on many days during the winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 1,620 mg/L Nov. 20, 1972; minimum daily mean, 42 mg/L Dec. 29, 1975.

SEDIMENT LOADS: Maximum daily, 222,000 tons Nov. 20, 1972; minimum daily, 2,970 tons Dec. 29, 1975.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-			DATE	TIME	DIS-			SPE-
		CHARGE, INST.	SPE- CIFIC CUBIC	TEMPER- ATURE FEET PER SECOND (DEG C) (00061)			CHARGE, INST.	SPE- CIFIC CUBIC	TEMPER- ATURE FEET PER SECOND (DEG C) (00061)	
OCT 1989					APR 1990					
03...	0910	29400	13.0	820	05...	1600	24600	8.0	800	
07...	0820	32400	12.0	740	10...	1810	23300	9.0	850	
11...	0955	28700	13.0	800	12...	1705	23900	7.0	840	
19...	1330	30300	10.5	700	17...	0715	26300	7.0	750	
23...	1445	30200	12.0	820	26...	1030	27100	14.5	840	
31...	1030	14600	8.0	800	MAY					
NOV					02...	1200	26600	14.0	800	
03...	1100	12400	7.0	790	15...	0900	24700	14.0	770	
06...	1110	11200	7.5	820	24...	1000	26800	12.0	675	
09...	0630	10600	5.0	790	31...	0615	27600	19.0	690	
14...	0830	10600	5.0	740	JUN					
17...	1530	10600	0.0	750	07...	0640	27700	16.0	789	
21...	0940	9660	2.0	800	12...	0915	28400	22.0	775	
27...	1500	10600	2.0	810	JUL					
29...	1225	13300	0.5	760	03...	0710	29000	25.0	790	
DEC					11...	1210	28900	23.0	770	
05...	1230	12500	2.5	810	16...	1220	26900	23.5	640	
06...	0700	13300	3.0	770	AUG					
14...	1330	13200	1.0	760	01...	0855	25500	23.0	780	
19...	1600	13400	0.0	720	07...	0620	26000	23.5	760	
FEB 1990					14...	0845	27700	23.0	790	
20...	1535	15400	1.0	790	28...	0630	27600	26.5	740	
27...	0925	14800	0.5	720	30...	0750	28200	26.0	747	
MAR					SEP					
06...	1015	10300	1.0	750	05...	0735	30600	25.5	734	
13...	1015	10400	3.0	725	12...	0900	31200	22.0	840	
20...	0730	9950	3.0	690	18...	0915	31100	18.0	800	
30...	1230	22100	8.0	700	27...	1105	29300	18.0	790	

MISSOURI RIVER MAIN STEM
06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued
WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION	DEPTH (FT FM)	SAMPLE LOC- ATION, CROSS SECTION	DEPTH (FEET)	STREAM SAM- PLING	VELOC- ITY (FPS)	SEDI- MENT, SUS- PENDED (MG/L)	SED. % FINER THAN .004 MM	SED. % FINER THAN .062 MM	SED. % FINER THAN .125 MM	SED. % FINER THAN .250 MM	SED. % FINER THAN .500 MM	SED. % SUSP. (70346)	
OCT															
19..	WATER	TEMPERATURE, 10.5 °C (0845-1200);	DISCHARGE, 30,300 ft³/s.												
19..	0845	505	19.6	--	4.50	3.42	85	--	78	96	100	--	--	--	--
19..	0849	505	--	9.80	3.07	101	--	77	92	100	--	--	--	--	
19..	0853	505	--	14.0	3.05	114	--	79	91	100	--	--	--	--	
19..	0857	505	--	16.3	2.96	92	--	70	90	100	--	--	--	--	
19..	0901	505	--	17.6	2.70	97	--	83	93	100	--	--	--	--	
19..	0905	505	--	18.4	2.11	118	--	69	83	94	100	--	--	--	
19..	0910	505	--	--	--	99	--	78	92	100	--	--	--	--	
19..	0925	415	17.6	4.10	3.98	129	--	51	70	100	--	--	--	--	
19..	0928	415	--	8.80	3.52	186	--	40	57	100	--	--	--	--	
19..	0931	415	--	12.6	3.39	195	--	36	57	100	--	--	--	--	
19..	0934	415	--	14.7	3.07	559	--	67	75	100	--	--	--	--	
19..	0937	415	--	15.8	2.76	392	--	21	40	99	100	--	--	--	
19..	0940	415	--	16.6	2.68	347	--	19	36	98	100	--	--	--	
19..	0945	415	--	--	--	199	--	37	56	100	--	--	--	--	
19..	0950	315	--	--	--	301	8	13	--	--	--	--	--	--	
19..	1000	315	14.0	3.20	4.48	--	--	--	--	--	--	--	--	--	
19..	1004	315	--	7.00	3.83	--	--	--	--	--	--	--	--	--	
19..	1008	315	--	10.0	3.59	--	--	--	--	--	--	--	--	--	
19..	1012	315	--	11.7	3.37	--	--	--	--	--	--	--	--	--	
19..	1016	315	--	12.6	3.18	--	--	--	--	--	--	--	--	--	
19..	1020	315	--	13.2	2.68	--	--	--	--	--	--	--	--	--	
19..	1025	315	--	--	--	267	--	22	42	96	100	--	--	--	
19..	1035	205	14.2	3.30	4.70	125	--	53	65	96	100	--	--	--	
19..	1041	205	--	7.10	4.80	176	--	41	52	95	100	--	--	--	
19..	1047	205	--	10.1	4.13	227	--	27	42	94	100	--	--	--	
19..	1053	205	--	11.8	3.94	302	--	22	37	92	100	--	--	--	
19..	1059	205	--	12.8	2.76	1080	--	5	10	51	98	100	--	--	
19..	1105	205	--	13.4	2.00	864	--	10	18	61	98	100	--	--	
19..	1110	205	--	--	--	188	--	34	49	94	100	--	--	--	
19..	1120	110	15.8	3.70	4.57	156	--	50	60	95	100	--	--	--	
19..	1124	110	--	7.90	3.98	187	--	40	50	95	100	--	--	--	
19..	1128	110	--	11.3	3.39	347	--	22	31	80	100	--	--	--	
19..	1132	110	--	13.2	3.48	478	--	19	26	72	100	--	--	--	
19..	1136	110	--	14.2	2.50	635	--	15	20	70	100	--	--	--	
19..	1140	110	--	14.9	2.53	583	--	12	19	72	100	--	--	--	
19..	1145	110	--	--	--	226	--	28	36	80	100	--	--	--	
APR															
26..	WATER	TEMPERATURE, 14.5 °C (0815-1115);	DISCHARGE, 27,100 ft³/s.												
26..	0815	475	12.0	2.80	3.39	118	--	81	88	100	--	--	--	--	--
26..	0823	475	--	8.60	2.98	158	--	64	74	99	100	--	--	--	--
26..	0827	475	--	10.0	2.63	228	--	43	52	94	100	--	--	--	--
26..	0831	475	--	10.8	2.48	306	--	33	42	92	100	--	--	--	--
26..	0835	475	--	--	--	158	--	34	62	95	100	--	--	--	--
26..	0850	310	12.4	2.90	3.63	104	--	76	87	100	--	--	--	--	--
26..	0854	310	--	6.20	3.42	159	--	51	63	97	100	--	--	--	--
26..	0858	310	--	8.90	2.94	207	--	41	52	97	100	--	--	--	--
26..	0902	310	--	10.3	2.55	338	--	27	40	94	100	--	--	--	--
26..	0906	310	--	11.2	2.29	581	--	15	24	87	100	--	--	--	--
26..	0910	310	--	--	--	222	--	34	45	96	100	--	--	--	--
26..	0915	215	--	--	--	291	8	20	--	--	--	--	--	--	--
26..	0920	215	16.0	3.70	4.57	--	--	--	--	--	--	--	--	--	--
26..	0923	215	--	8.00	3.85	--	--	--	--	--	--	--	--	--	--
26..	0926	215	--	11.4	3.39	--	--	--	--	--	--	--	--	--	--
26..	0929	215	--	13.3	2.94	--	--	--	--	--	--	--	--	--	--
26..	0932	215	--	14.4	2.92	--	--	--	--	--	--	--	--	--	--
26..	0935	215	--	15.1	2.42	--	--	--	--	--	--	--	--	--	--
26..	0940	215	--	--	--	220	--	41	55	94	100	--	--	--	--
26..	0955	145	16.6	3.8	4.91	224	--	45	57	96	100	--	--	--	--
26..	0958	145	--	8.30	4.44	187	--	40	57	98	100	--	--	--	--
26..	1001	145	--	11.9	3.83	290	--	41	54	96	100	--	--	--	--
26..	1007	145	--	14.9	3.55	531	--	23	34	79	100	--	--	--	--
26..	1010	145	--	15.6	3.09	814	--	12	20	66	100	--	--	--	--
26..	1015	145	--	--	--	201	--	40	56	97	100	--	--	--	--
26..	1040	85.0	18.6	4.30	5.30	159	--	61	73	98	100	--	--	--	--
26..	1043	85.0	--	9.30	4.89	192	--	53	70	97	100	--	--	--	--
26..	1046	85.0	--	13.3	4.26	288	--	36	45	95	100	--	--	--	--
26..	1049	85.0	--	15.5	3.72	254	--	27	41	92	100	--	--	--	--
26..	1052	85.0	--	16.7	3.81	431	--	25	35	84	100	--	--	--	--
26..	1055	85.0	--	17.5	3.76	494	--	15	23	74	100	--	--	--	--
26..	1100	85.0	--	--	--	176	--	36	48	91	100	--	--	--	--

MISSOURI RIVER MAIN STEM

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06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAMPLE	DEPTH	STREAM	SEDI-	SED.	SED.	SED.	SED.	SED.	SED.
		LOC-	AT			SAMP-	VELOC-	FALL	FALL	FALL	FALL
CROSS	LOC-	SAMP-	PLING	ITY,	SUS-	FALL	FALL	FALL	FALL	FALL	FALL
SECTION	ATION,	SECTION	(FT FM	TOTAL	DEPTH	POINT	PENDED	% FINER	% FINER	% FINER	% FINER
L BANK)	(FEET)	(00009)	(81903)	(00003)	(81904)	(FPPS)	(MG/L)	.004 MM	.062 MM	.125 MM	.250 MM
JUN	26...	WATER	TEMPERATURE, 16.0 °C (0750-1030); DISCHARGE, 27,700 ft³/s.								
07...	0750	490	12.2	2.80	3.91	126	--	90	96	100	--
07...	0754	490	--	6.10	3.46	126	--	84	91	100	--
07...	0758	490	--	8.70	3.20	153	--	70	78	100	--
07...	0802	490	--	10.2	2.96	140	--	77	83	100	--
07...	0810	490	--	--	--	130	--	87	91	100	--
07...	0820	375	11.0	2.50	4.22	150	--	77	88	100	--
07...	0824	375	--	5.50	3.76	160	--	66	76	98	100
07...	0828	375	--	7.90	3.83	186	--	54	65	98	100
07...	0832	375	--	9.20	3.52	180	--	34	50	94	100
07...	0836	375	--	9.90	2.87	262	--	29	40	91	100
07...	0840	375	--	--	--	158	--	57	70	97	100
07...	0850	260	12.4	2.90	3.94	--	--	--	--	--	--
07...	0854	260	--	6.20	3.70	--	--	--	--	--	--
07...	0858	260	--	8.90	3.72	--	--	--	--	--	--
07...	0902	260	--	10.3	3.18	--	--	--	--	--	--
07...	0906	260	--	11.2	3.09	--	--	--	--	--	--
07...	0910	260	--	--	--	225	--	47	62	99	100
07...	0912	260	--	--	--	188	15	23	--	--	--
07...	0920	165	16.6	3.80	4.63	127	--	70	85	100	--
07...	0924	165	--	8.30	4.15	177	--	56	69	99	100
07...	0928	165	--	11.9	3.94	170	--	34	53	98	100
07...	0932	165	--	13.8	3.07	320	--	34	48	99	100
07...	0936	165	--	14.9	3.07	342	--	31	43	90	100
07...	0940	165	--	15.6	2.72	433	--	25	36	91	100
07...	0945	165	--	--	--	226	--	54	66	98	100
07...	1010	100	18.8	4.30	4.50	131	--	80	89	99	100
07...	1013	100	--	9.40	4.39	137	--	65	78	100	--
07...	1016	100	--	13.4	4.15	189	--	50	61	99	100
07...	1022	100	--	16.9	3.61	278	--	37	48	97	100
07...	1025	100	--	17.7	3.50	440	--	27	37	94	100
07...	1030	100	--	--	--	141	--	65	74	98	100
		SAMPLE	DEPTH								
		LOC-	AT								
		ATION,	SAMPLE								
		CROSS	LOC-								
		SECTION	ATION,								
		SECTION	(FT FM								
		L BANK)	(FEET)								
		(00009)	(81903)								
JUL	26...	WATER	TEMPERATURE, 20.0 °C (0755-1050); DISCHARGE, 28,600 ft³/s.								
26...	0755	500	18.4	4.30	4.04	89	--	96	98	100	--
26...	0800	500	--	9.20	3.85	105	--	98	100	--	--
26...	0805	500	--	13.1	3.46	112	--	98	99	100	--
26...	0810	500	--	15.3	3.42	128	--	88	93	100	--
26...	0815	500	--	16.6	3.13	120	--	84	90	98	100
26...	0820	500	--	17.3	2.85	130	--	87	91	99	100
26...	0825	500	--	--	--	139	--	96	97	100	--
26...	0835	415	18.0	4.20	4.04	118	--	94	98	100	--
26...	0840	415	--	9.00	3.68	140	--	77	87	99	100
26...	0845	415	--	12.9	3.57	132	--	68	82	98	100
26...	0850	415	--	15.0	2.81	291	--	66	75	98	100
26...	0855	415	--	16.2	2.42	189	--	51	63	97	100
26...	0900	415	--	17.0	2.29	360	--	32	44	86	100
26...	0905	415	--	--	--	142	--	75	87	99	100
26...	0915	300	13.8	3.20	4.37	--	--	--	--	--	--
26...	0919	300	--	6.90	4.22	--	--	--	--	--	--
26...	0923	300	--	9.90	3.83	--	--	--	--	--	--
26...	0927	300	--	11.5	3.63	--	--	--	--	--	--
26...	0931	300	--	12.4	3.46	--	--	--	--	--	--
26...	0935	300	--	13.0	3.46	--	--	--	--	--	--
26...	0940	300	--	--	--	183	--	52	65	99	100
26...	0945	300	--	--	--	166	22	31	--	--	--
26...	0950	200	14.4	3.30	4.07	149	--	68	76	97	100
26...	0953	200	--	7.10	3.76	181	--	60	69	96	100
26...	0956	200	--	10.1	3.39	216	--	49	59	94	100
26...	1000	200	--	11.8	3.28	263	--	38	49	90	100
26...	1004	200	--	12.8	2.31	517	--	21	25	66	100
26...	1008	200	--	13.4	1.87	14100	--	2	2	33	100
26...	1015	200	--	--	--	1170	--	10	11	25	95
26...	1035	90.0	120.0	2.80	4.61	119	--	93	95	99	100
26...	1038	90.0	--	6.00	4.37	226	--	63	67	92	100
26...	1041	90.0	--	8.60	3.57	288	--	42	48	73	100
26...	1044	90.0	--	10.0	3.18	332	--	41	46	79	100
26...	1047	90.0	--	10.8	3.18	244	--	26	32	66	100
26...	1050	90.0	--	--	--	274	--	50	55	83	100

MISSOURI RIVER MAIN STEM

06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued
WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAMPLE	DEPTH			SED.	SED.	SED.	SED.	SED.	SED.
		LOC- ATION, CROSS SECTION	LOC- ATION, (FT FM (00009)	SAMPLE (00003)	STREAM TOTAL (FEET) (81903)	SEDI- MENT, ITY (FPS) (81904)	SUS- PENDED (MG/L) (80154)	% FINER THAN .004 MM (70338)	FALL DIAM. .062 MM (70342)	FALL DIAM. .125 MM (70343)	FALL DIAM. .250 MM (70344)	FALL DIAM. .500 MM (70345)
AUG											
30...		WATER TEMPERATURE, 26.0 °C (0745-1050); DISCHARGE, 28,600 ft³/s.									
30...	0745	480	24.0	4.70	3.24	76	--	93	99	100	--
30...	0748	480	--	10.2	2.96	105	--	94	98	100	--
30...	0750	480	--	14.6	2.85	81	--	86	95	100	--
30...	0754	480	--	17.0	2.42	110	--	84	95	100	--
30...	0800	480	--	18.4	2.09	120	--	79	88	100	--
30...	0805	480	--	19.2	1.98	115	--	75	87	100	--
30...	0810	480	--	--	--	99	--	94	98	100	--
30...	0825	400	17.8	4.10	3.83	84	--	82	95	100	--
30...	0828	400	--	8.90	3.96	114	--	77	95	100	--
30...	0831	400	--	12.7	3.18	105	--	63	82	100	--
30...	0834	400	--	14.8	2.96	175	--	48	69	100	--
30...	0838	400	--	16.0	2.63	186	--	44	64	100	--
30...	0840	400	--	16.8	2.53	114	--	68	84	100	--
30...	0845	400	--	--	249	--	30	51	99	100	--
30...	0905	315	14.6	3.40	4.04	--	--	--	--	--	--
30...	0908	315	--	7.30	3.78	--	--	--	--	--	--
30...	0911	315	--	10.4	3.50	--	--	--	--	--	--
30...	0914	315	--	12.2	3.35	--	--	--	--	--	--
30...	0918	315	--	13.1	2.68	--	--	--	--	--	--
30...	0921	315	--	13.7	2.00	--	--	--	--	--	--
30...	0925	315	--	--	145	--	56	72	99	100	--
30...	0930	315	--	--	215	8	14	--	--	--	--
30...	0940	190	12.8	3.00	4.59	106	--	70	80	100	--
30...	0945	190	--	6.40	3.98	111	--	52	65	98	100
30...	0950	190	--	9.10	3.55	161	--	30	42	95	100
30...	0955	190	--	10.7	3.50	297	--	30	41	82	100
30...	1000	190	--	11.5	3.39	354	--	28	37	79	100
30...	1005	190	--	--	--	--	--	--	--	--	--
30...	1010	190	--	--	105	--	61	70	97	100	--
30...	1030	90.0	12.4	2.90	5.02	119	--	69	74	100	--
30...	1034	90.0	--	6.20	4.15	96	--	67	72	98	100
30...	1038	90.0	--	8.90	3.50	237	--	28	34	75	100
30...	1042	90.0	--	10.3	3.50	175	--	39	46	88	100
30...	1046	90.0	--	11.2	3.50	215	--	34	40	78	100
30...	1050	90.0	--	--	--	197	--	34	39	83	100

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE,	NUMBER	BED	BED	BED	BED	BED	BED	BED	BED	
		INST. CUBIC FEET SECOND	OF SAM- PLING PER SECOND (00061)	MAT. SIEVE DIAM. (COUNT) (00063)	MAT. SIEVE DIAM. (80164)	MAT. SIEVE DIAM. (80165)	MAT. SIEVE DIAM. (80166)	MAT. SIEVE DIAM. (80167)	MAT. SIEVE DIAM. (80168)	MAT. SIEVE DIAM. (80169)	MAT. SIEVE DIAM. (80170)	MAT. SIEVE DIAM. (80171)	MAT. SIEVE DIAM. (80172)
OCT												
19...	1215	30300	5	--	0	15	71	96	99	99	100	--
APR	26...	1110	27100	5	--	0	30	92	98	99	100	--
JUN	07...	1035	27700	5	--	0	15	80	96	97	97	98
JUL	26...	1120	28600	5	--	0	20	86	99	99	100	--
AUG	30...	1110	28200	5	0	1	23	76	92	96	99	100

06600000 PERRY CREEK AT 38th STREET, SIOUX CITY, IA

LOCATION.--Lat 42°32'08", long 96°24'39", in SE1/4 SE1/4 sec.8, T.89 N., R. 47 W., Woodbury County, Hydrologic Unit 10230001, on left bank at downstream side of bridge on 38th Street in Sioux City, 1.9 mi downstream from West Branch, and 3.6 mi upstream from mouth.

DRAINAGE AREA.--65.1 mi².

PERIOD OF RECORD.--October 1945 to September 1969, June 1981 to current year.

REVISED RECORDS.--WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,112.04 ft above NGVD (City of Sioux City benchmark). Prior to May 20, 1954, nonrecording gage with supplementary water-stage recorder in operation above 5.0 ft gage height and May 20, 1954 to Sept. 30, 1969, water-stage recorder at present site at datum 5.0 ft higher.

REMARKS.--Estimated daily discharges: Oct. 2 to Nov. 19, Nov. 27 to Dec. 1, Dec. 11 to Jan. 8, Jan. 10, 11, 13-17, 20, 21, 25, Jan. 30 to Feb. 5, Feb. 14, 16-19, 24, May 31, June 13-17, and Sept. 22-30. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--33 years (water years 1946-69, 1982-90), 17.2 ft³/s, 3.59 in/yr, 12,460 acre-ft/yr; median of yearly mean discharges, 14 ft³/s, 2.9 in/yr, 10,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,670 ft³/s May 19, 1990, gage height, 28.54 ft, present datum, from rating curve extended above 1,700 ft³/s on basis of slope-area measurement of peak flow; no flow at times in 1946, 1958-60.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 7, 1944, reached a stage of about 30.5 ft, from floodmarks, present datum, discharge, 9,600 ft³/s, on basis of contracted-opening measurement of peak flow by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 19	0330	*8,670	*28.54	July 19	2100	3,310	17.76
May 23	0700	4,770	26.02				

Minimum daily discharge 0.90 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.2	2.5	3.7	2.0	2.7	5.0	5.6	5.1	20	6.2	7.2	3.3
2	2.3	2.2	3.8	2.2	2.2	6.0	4.8	5.1	21	5.8	6.8	27
3	2.1	2.3	3.0	2.7	2.3	5.8	4.7	5.0	22	5.5	6.8	15
4	2.5	2.9	3.3	2.5	2.6	5.5	4.9	5.1	19	5.1	6.5	4.9
5	3.2	2.8	4.0	2.4	3.3	5.7	4.7	4.7	19	4.9	5.7	4.2
6	2.5	2.7	3.7	2.2	4.9	5.3	4.5	4.5	17	4.8	5.2	3.9
7	2.0	3.0	3.1	3.0	5.8	9.9	4.5	4.8	16	4.6	5.1	3.6
8	2.3	3.4	3.0	3.5	18	47	4.9	5.4	16	4.5	5.0	3.4
9	2.6	3.2	2.9	4.3	9.4	43	8.1	22	15	4.6	4.8	3.6
10	2.3	3.3	3.1	4.1	6.3	14	6.5	11	14	5.3	5.0	3.3
11	2.5	3.7	2.5	4.4	6.2	12	4.8	6.8	14	5.2	5.0	3.5
12	2.2	3.7	1.9	4.6	15	13	4.5	7.9	14	5.0	4.6	3.4
13	2.3	3.0	2.3	4.5	16	14	5.1	6.0	14	4.6	4.3	3.2
14	3.1	3.1	1.7	4.2	5.4	23	5.5	5.5	13	4.5	4.3	2.9
15	2.8	3.5	1.3	3.5	5.9	13	5.0	12	19	4.4	4.0	3.5
16	2.7	2.9	1.5	3.1	4.0	9.2	6.2	47	80	4.3	4.0	3.3
17	2.7	3.2	1.7	3.4	3.0	8.4	4.9	10	99	4.2	4.3	3.5
18	2.6	3.5	1.9	3.8	3.3	7.6	4.5	96	37	4.2	4.0	8.4
19	2.7	4.3	1.4	3.7	3.8	6.2	4.9	2260	22	551	4.7	4.7
20	2.6	5.4	1.3	3.4	4.6	5.8	4.9	63	17	158	4.2	3.3
21	2.7	4.8	1.0	3.6	5.6	7.1	4.8	34	16	14	4.2	3.3
22	2.8	4.1	.90	3.8	7.5	8.1	4.8	26	16	9.8	4.0	3.1
23	2.8	3.5	1.0	4.3	7.0	6.0	6.0	1090	13	8.3	23	2.9
24	2.7	4.2	1.2	3.9	6.0	5.3	5.9	142	11	11	63	2.8
25	2.5	4.4	1.4	3.5	5.1	5.2	5.2	264	9.4	36	11	3.5
26	2.7	4.2	1.3	3.9	4.9	5.1	5.2	51	8.8	12	5.8	3.5
27	3.8	3.4	1.6	3.8	5.1	4.9	4.9	33	7.8	9.8	4.6	3.3
28	2.3	2.8	1.9	3.7	4.5	5.3	4.9	30	7.6	11	4.0	3.5
29	3.8	3.1	2.5	3.9	--	5.2	6.4	25	7.3	25	3.7	3.6
30	3.4	3.3	2.4	3.5	--	5.4	6.1	21	6.9	9.5	3.5	3.8
31	2.2	--	2.2	3.0	--	5.4	--	22	--	7.8	3.3	--
TOTAL	82.9	102.4	68.50	108.4	170.4	322.4	157.7	4324.9	611.8	950.9	231.6	145.2
MEAN	2.67	3.41	2.21	3.50	6.09	10.4	5.26	140	20.4	30.7	7.47	4.84
MAX	3.8	5.4	4.0	4.6	18	47	8.1	2260	99	551	63	27
MIN	2.0	2.2	.90	2.0	2.2	4.9	4.5	4.5	6.9	4.2	3.3	2.8
AC-FT	164	203	136	215	338	639	313	8580	1210	1890	459	288
CFSM	.04	.05	.03	.05	.09	.16	.08	2.14	.31	.47	.11	.07
IN.	.05	.06	.04	.06	.10	.18	.09	2.47	.35	.54	.13	.08

CAL YR 1989 TOTAL 4222.30 MEAN 11.6 MAX 692 MIN .90 AC-FT 8370 CFSM .18 IN. 2.41
WTR YR 1990 TOTAL 7277.10 MEAN 19.9 MAX 2260 MIN .90 AC-FT 14430 CFSM .31 IN. 4.16

FLOYD RIVER BASIN

06600100 FLOYD RIVER AT ALTON, IA

LOCATION.--Lat 42°58'55", long 96°00'03", in NE1/4 NE1/4 sec.11, T.94 N., R.44 W., Sioux County, Hydrologic Unit 10230002, on left bank 270 ft downstream from South County Road at east edge of Alton, 34.3 mi upstream from West Branch Floyd River, and at mile 58.1.

DRAINAGE AREA.--268 mi².

PERIOD OF RECORD.--October 1955 to current year. Prior to December 1955, monthly discharge only, published in WSP 1730.

REVISED RECORDS.--WDR IA-82-1: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,269.55 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 16, 27-29, Dec. 2-4, Dec. 6 to Jan. 25, Jan. 31 to Feb. 4, and Feb. 13 to Mar. 6. Records good except those for estimated daily charges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--35 years, 69.6 ft³/s, 3.53 in/yr, 50,420 acre-ft/yr; median of yearly mean discharges, 54 ft³/s, 2.7 in/yr, 39,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,300 ft³/s June 20, 1983, gage height 18.54 ft, from flood-mark, from rating curve extended above 8,500 ft³/s; no flow at times in 1956, 1958, 1959, 1965, 1968, and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1953 reached a discharge of about 45,500 ft³/s, from information by U. S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 18	0800	830	9.70	June 28	0400	1,270	11.22
June 20	0100	1,150	10.82	June 28	2345	*2,240	*14.05

Minimum daily discharge, 0.70 ft³/s Dec. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.8	2.4	3.0	.82	1.2	3.5	10	8.7	37	205	39	6.0
2	2.1	2.4	2.7	.90	1.1	4.3	9.0	7.5	35	154	41	7.8
3	2.4	2.3	2.5	.97	1.2	5.0	8.2	6.2	34	126	39	8.5
4	2.9	2.1	2.7	.94	1.4	5.6	7.8	5.6	33	105	38	6.7
5	2.8	2.4	2.8	.87	1.7	4.8	7.6	5.4	31	88	35	5.4
6	2.8	2.5	2.7	.84	1.7	4.3	7.1	5.1	29	78	32	4.8
7	3.0	3.7	2.6	.86	1.8	4.5	6.6	4.9	27	71	21	4.4
8	3.1	2.6	2.4	.90	1.8	22	6.5	4.3	25	65	16	3.9
9	3.5	2.4	2.8	.93	1.8	19	6.8	11	23	57	14	3.5
10	3.4	2.3	2.1	1.1	1.8	16	6.8	16	21	51	13	3.2
11	3.3	2.0	1.6	1.4	1.7	21	6.6	15	19	48	16	3.0
12	3.2	1.7	1.2	1.3	1.8	39	6.1	14	17	47	13	2.6
13	3.2	1.7	1.3	1.4	1.7	43	6.1	14	15	42	12	2.7
14	3.6	1.7	1.1	1.6	1.3	40	6.4	13	13	39	10	2.1
15	3.7	1.8	.98	1.9	1.4	30	6.5	13	12	36	9.5	2.0
16	2.6	1.4	1.1	2.0	1.2	23	6.5	14	60	33	8.7	1.8
17	2.4	1.6	1.2	1.9	1.2	19	6.4	17	539	30	8.4	1.8
18	2.4	1.9	1.1	1.8	1.3	17	6.4	15	709	28	8.1	3.2
19	1.9	2.0	.97	1.6	1.4	12	6.0	20	631	32	9.5	5.7
20	2.2	1.3	.84	1.3	1.5	13	5.8	30	863	42	12	5.8
21	2.7	1.4	.75	1.1	1.7	13	6.4	38	329	41	10	4.3
22	3.1	1.8	.70	1.2	1.9	18	5.6	42	232	36	9.1	4.1
23	2.7	2.0	.70	1.4	2.8	18	5.4	43	181	31	9.8	3.5
24	2.9	2.3	.75	1.3	2.6	17	6.3	44	145	30	16	2.8
25	2.8	2.6	.80	1.3	2.3	14	6.2	57	121	31	13	2.5
26	2.8	2.8	.78	1.4	2.5	14	5.8	65	101	32	10	2.4
27	2.7	2.2	.76	1.3	3.0	13	5.3	63	84	32	8.4	2.4
28	2.9	2.0	.80	1.3	2.9	12	5.2	57	1320	32	8.2	2.5
29	3.0	2.5	.92	1.4	--	12	7.8	51	914	32	7.5	3.2
30	3.1	2.8	.90	1.3	--	11	9.3	44	301	30	6.8	3.5
31	2.7	--	.86	1.3	--	10	--	39	--	36	6.0	--
TOTAL	88.7	64.6	46.41	39.63	49.7	498.0	202.5	782.7	6901	1740	500.0	116.1
MEAN	2.86	2.15	1.50	1.28	1.77	16.1	6.75	25.2	230	56.1	16.1	3.87
MAX	3.7	3.7	3.0	2.0	3.0	43	10	65	1320	205	41	8.5
MIN	1.9	1.3	.70	.82	1.1	3.5	5.2	4.3	12	28	6.0	1.8
AC-FT	176	128	92	79	99	968	402	1550	13690	3450	992	230
CFSM	.01	.01	.01	.00	.01	.06	.03	.09	.86	.21	.06	.01
IN.	.01	.01	.01	.01	.01	.07	.03	.11	.96	.24	.07	.02

CAL YR 1989 TOTAL 5830.01 MEAN 16.0 MAX 472 MIN .70 AC-FT 11560 CFSM .06 IN. .81
WTR YR 1990 TOTAL 11029.34 MEAN 30.2 MAX 1320 MIN .70 AC-FT 21880 CFSM .11 IN. 1.53

06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IA

LOCATION.--Lat 42°55'25", long 96°10'34", in NE1/4 NE1/4 sec. 32, T. 94 N., R. 45 W., Sioux County, Hydrologic Unit 10230002, on left bank near wingwall at downstream side of bridge on county highway B62, 0.1 mi west of U.S. Highway 75, 0.8 mi downstream from Orange City slough, 2.2 mi northeast of Struble, 21.4 mi upstream from Floyd River, and at mile 45.2 upstream from mouth of Floyd River.

DRAINAGE AREA.--180 mi².

PERIOD OF RECORD.--October 1955 to current year. Prior to December 1955, monthly discharge only, published in WSP 1730.

REVISED RECORDS.--WDR IA-82-1: Drainage area, 1978-81 (P).

GAGE.--Water-stage recorder. Datum of gage is 1,239.40 ft above NGVD (State Highway Commission bench mark). Prior to Jan. 5, 1978, at site 721 ft right at old channel at same datum.

REMARKS.--Estimated daily discharges: Nov. 15-19, 22-24, Nov. 27 to Mar. 6, Apr. 27 to May 16, and July 27 to Aug. 2. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--35 years, 45.5 ft³/s, 3.43 in/yr, 32,960 acre-ft/yr; median of yearly mean discharges, 33 ft³/yr, 2.5 in/yr, 23,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,060 ft³/s Mar. 28, 1962, gage height, 15.63 ft; maximum gage height, 15.86 ft June 20, 1983; no flow at times some years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 17	0100	*3,940	*14.57	June 28	0830	1,740	11.78
June 19	1900	590	8.06				

Minimum daily discharge, 1.3 ft³/s Dec. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.6	4.5	5.6	1.6	2.0	6.8	8.6	8.0	32	152	22	11
2	2.9	3.5	4.5	1.8	1.7	7.4	8.0	7.8	32	126	19	11
3	2.7	3.6	3.7	2.1	2.0	8.2	8.2	7.6	31	107	18	13
4	3.3	4.4	4.5	2.0	2.4	9.0	8.2	7.6	28	87	17	11
5	3.4	4.3	5.0	1.9	3.0	8.3	8.1	7.8	27	78	15	9.9
6	3.3	4.0	4.6	1.9	3.5	7.2	7.9	7.4	25	73	14	9.3
7	2.7	4.1	4.3	2.3	3.3	6.6	7.9	6.8	24	68	14	9.1
8	3.1	4.4	3.9	2.5	3.0	8.2	8.2	7.2	23	60	14	9.2
9	3.4	4.9	4.5	2.6	2.6	18	8.1	9.0	22	54	13	8.5
10	3.1	4.1	4.0	2.8	2.6	15	7.8	11	22	51	14	8.8
11	3.3	4.2	3.1	3.3	2.7	15	7.8	10	21	48	17	8.1
12	3.2	4.3	2.6	2.9	3.0	17	7.9	11	20	45	13	7.9
13	3.1	3.3	3.1	3.0	2.0	13	8.1	10	19	40	12	7.6
14	3.4	3.5	2.5	3.8	1.6	31	8.2	9.6	18	39	12	7.3
15	3.3	2.8	2.3	3.3	1.7	20	7.8	11	24	38	11	7.2
16	3.3	2.6	2.7	2.7	1.6	15	7.5	17	342	38	11	7.0
17	3.4	3.5	3.0	2.3	1.5	14	7.6	15	2440	41	11	6.9
18	3.4	4.0	2.9	2.2	1.5	13	7.7	14	427	44	11	9.9
19	3.8	4.8	2.6	2.1	1.7	11	7.9	25	354	84	12	11
20	4.0	5.7	2.0	1.9	2.5	12	7.8	29	400	72	12	8.9
21	4.4	6.8	1.5	1.8	3.6	11	7.6	26	183	47	11	8.3
22	4.4	5.4	1.3	2.1	6.0	12	7.7	25	154	39	11	7.9
23	4.0	4.8	1.3	2.4	7.6	11	7.6	44	128	32	15	7.7
24	3.7	5.2	1.4	2.2	5.6	11	8.2	39	109	38	19	7.8
25	3.8	4.6	1.6	2.0	5.2	10	7.5	76	93	37	14	7.9
26	4.4	6.1	1.5	2.3	6.0	9.6	7.1	70	80	38	12	9.3
27	3.8	3.5	1.5	2.7	6.8	9.5	7.0	52	72	30	11	9.6
28	3.8	2.3	1.7	3.0	6.1	9.3	7.6	45	995	28	10	10
29	4.1	2.2	1.9	3.5	---	9.2	8.6	40	576	32	10	10
30	3.5	4.1	1.8	3.4	---	8.9	8.4	36	202	22	10	11
31	3.5	---	1.7	2.7	---	9.4	---	33	---	20	9.9	---
TOTAL	109.1	125.5	88.6	77.1	92.8	366.6	236.6	717.8	6923	1708	414.9	272.1
MEAN	3.52	4.18	2.86	2.49	3.31	11.8	7.89	23.2	231	55.1	13.4	9.07
MAX	4.4	6.8	5.6	3.8	7.6	31	8.6	76	2440	152	22	13
MIN	2.7	2.2	1.3	1.6	1.5	6.6	7.0	6.8	18	20	9.9	6.9
AC-FT	216	249	176	153	184	727	469	1420	13730	3390	823	540
CFSM	.02	.02	.02	.01	.02	.07	.04	.13	1.28	.31	.07	.05
IN.	.02	.03	.02	.02	.02	.08	.05	.15	1.43	.35	.09	.06

CAL YR 1989 TOTAL 5008.3 MEAN 13.7 MAX 517 MIN 1.3 AC-FT 9930 CFSM .08 IN. 1.04
WTR YR 1990 TOTAL 11132.1 MEAN 30.5 MAX 2440 MIN 1.3 AC-FT 22080 CFSM .17 IN. 2.30

FLOYD RIVER BASIN

06600500 FLOYD RIVER AT JAMES, IA

LOCATION.--Lat. 42°34'36", long 96°18'43", in SE1/4 SE1/4 sec.30, T.90 N., R.46 W., Plymouth County, Hydrologic Unit 10230002, on left bank at upstream side of bridge on county highway C70, 0.2 mi east of James, 14.3 mi downstream from West Branch Floyd River, and at mile 7.5.

DRAINAGE AREA.--886 mi².

PERIOD OF RECORD.--December 1934 to current year.

REVISED RECORDS.--WSP 1240: 1935 (M), 1936, 1937-38 (M), 1942, 1945. WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,092.59 ft above NGVD. Prior to Sept. 11, 1938, June 9 to Nov. 5, 1953, and Oct. 1, 1955, to May 22, 1957, nonrecording gage and May 23, 1957, to Sept. 30, 1970, water-stage recorder at same site at datum 10.0 ft higher.

REMARKS.--Estimated daily discharges: Nov. 16-18, Nov. 20 to Mar. 4, May 7, 16-25, and June 6-11. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers and satellite data collection platform at station.

AVERAGE DISCHARGE.--55 years (water years 1936-90), 220 ft³/s, 3.37 in/yr, 159,400 acre-ft/yr; median of yearly mean discharges, 160 ft³/s, 2.4 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 71,500 ft³/s June 8, 1953, gage height, 25.3 ft, from flood-marks, datum then in use, from rating curve extended above 16,000 ft³/s on basis of contracted-opening and flow-over-embankment measurement of peak flow; minimum daily discharge, 0.90 ft³/s Jan. 10-22, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage and discharge since 1892, that of June 8, 1953, from information by U. S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 19	unknown	*8,090	(a)*20.70	June 29	0100	3,880	16.53
May 23	unknown	4,210	(a) 16.84	July 19	2100	2,620	15.25
June 17	0700	6,420	19.00				

(a) from floodmarks

Minimum daily discharge, 9.6 ft³/s Dec. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	30	35	13	20	45	53	53	152	597	142	66
2	22	30	32	16	18	50	51	52	143	450	141	81
3	23	30	25	18	19	56	50	52	137	369	134	80
4	24	31	28	17	22	60	49	51	122	309	128	69
5	26	30	32	16	30	55	48	52	114	270	122	63
6	26	29	29	16	36	49	49	51	107	240	117	60
7	26	30	28	21	42	50	48	45	98	219	114	58
8	27	30	25	22	37	56	48	47	93	200	110	56
9	27	29	27	23	36	107	49	62	88	184	105	55
10	27	29	25	26	36	88	52	71	81	172	103	54
11	31	27	20	27	42	90	50	69	77	162	108	53
12	30	27	17	24	50	101	49	72	72	149	108	52
13	27	27	19	27	45	98	49	71	68	140	101	51
14	27	26	15	35	15	113	50	67	64	137	96	49
15	26	26	14	50	17	112	49	65	73	137	93	48
16	24	21	16	54	14	92	48	100	617	136	89	47
17	25	25	17	52	14	81	48	60	5310	135	90	46
18	27	26	17	48	16	72	48	70	1990	135	89	50
19	29	31	15	40	17	66	48	3300	1080	679	90	54
20	29	33	14	30	20	64	49	490	1340	429	87	52
21	30	32	11	23	26	62	48	540	1180	240	85	51
22	29	29	9.6	26	35	62	48	790	685	197	84	47
23	30	28	9.6	31	40	60	47	2100	533	177	89	44
24	29	30	11	27	33	60	49	660	443	167	115	44
25	29	31	12	25	34	59	50	590	381	194	100	44
26	30	33	11	29	41	57	49	494	336	164	90	44
27	32	20	12	34	42	55	47	292	299	166	85	43
28	31	12	15	36	39	54	48	239	1350	160	80	42
29	32	11	16	37	--	53	53	205	2970	157	75	42
30	32	23	15	27	--	53	54	181	1060	148	72	42
31	32	--	14	25	--	53	--	165	--	140	69	--
TOTAL	863	816	586.2	895	836	2133	1478	11156	21063	7159	3111	1587
MEAN	27.8	27.2	18.9	28.9	29.9	68.8	49.3	360	702	231	100	52.9
MAX	32	33	35	54	50	113	54	3300	5310	679	142	81
MIN	22	11	9.6	13	14	45	47	45	64	135	69	42
AC-FT	1710	1620	1160	1780	1660	4230	2930	22130	41780	14200	6170	3150
CFSM	.03	.03	.02	.03	.03	.08	.06	.41	.79	.26	.11	.06
IN.	.04	.03	.02	.04	.04	.09	.06	.47	.88	.30	.13	.07

CAL YR 1989 TOTAL 26733.2 MEAN 73.2 MAX 2060 MIN 9.6 AC-FT 53030 CFSM .08 IN. 1.12
WTR YR 1990 TOTAL 51683.2 MEAN 142 MAX 5310 MIN 9.6 AC-FT 102500 CFSM .16 IN. 2.17

06601200 MISSOURI RIVER AT DECATUR, NE

LOCATION.--Lat 42°00'26", long 96°14'29", in NE1/4 SW1/4 sec.36, T.24 N., R.10 E., Burt County, Hydrologic Unit 10230001, on right bank 0.1 mi upstream from Iowa Highway 175 bridge at Decatur, and at mile 691.0.

DRAINAGE AREA.--316,200 mi², approximately. The 3,959 mi² in Great Divide basin are not included.

PERIOD OF RECORD.--October 1987 to current year.

GAGE.--Water-stage encoder. Datum of gage is 1,010.00 ft above NGVD, supplementary adjustment of 1954.

REMARKS.--Estimated daily discharges: Dec. 14 to Jan. 12. Records good except those for estimated daily discharges, which are poor. Flow regulated by upstream main-stem reservoirs. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,900 ft³/s May 19, 1990; maximum gage height 25.59 ft Sept. 16, 1988; minimum daily discharge, 8,290 ft³/s Jan. 9, 1989; minimum gage height, 13.78 ft, Jan. 9, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 40,900 ft³/s May 19, gage height, 25.17 ft; minimum daily discharge, 9,920 ft³/s Mar. 19; minimum gage height, 15.36 ft, Mar. 19.

**DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES**

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30200	14800	13000	12300	13000	11600	22800	27300	30300	28700	25500	28500
2	30300	13900	11700	12500	13400	11000	22900	27100	26600	27900	25500	29300
3	30200	13500	11900	12900	12000	10800	22800	27000	27100	30600	26200	30400
4	30200	13500	11800	13300	13700	11000	23300	26900	30100	26300	26500	30700
5	30200	13300	13200	13100	14700	11000	24100	26700	26000	26400	26400	30900
6	30600	12100	12200	12800	14300	10900	24500	26500	26500	29300	26000	31000
7	30600	11800	11800	12700	13300	10800	24400	26200	29700	26100	26300	31200
8	30900	11600	12400	12700	12500	11000	24500	26000	26000	26700	26500	31300
9	30800	11400	12800	12900	12800	10900	24800	26600	26200	29000	27300	31000
10	30700	11500	13200	13200	11900	10800	25100	27100	29100	27100	27900	31100
11	30700	11100	13300	12900	11800	11000	25100	25100	25200	28300	28400	31100
12	30600	11000	14000	12500	11800	11000	25300	23700	25500	29300	28400	31100
13	30500	11000	14800	12000	12700	11000	25300	24700	29200	28000	28200	31200
14	30500	10900	18300	11700	14200	11000	25800	28700	25200	27900	28300	31400
15	30500	10900	17000	13000	14500	11100	26200	25600	26700	28900	27800	31500
16	30500	11000	11500	13400	15100	10500	26500	26300	34700	27700	27500	31500
17	30500	11300	15000	12900	16000	10500	26800	29400	31500	27800	27400	31600
18	30600	12100	16500	12700	15200	10200	26600	25500	31200	29100	27300	32100
19	30800	11200	17500	12500	15900	9920	26200	33000	29800	27900	27000	32700
20	30900	11100	17000	12100	16000	9940	26100	36500	27600	32000	27100	32300
21	31000	11100	16600	11400	14900	10200	26100	26000	29800	29600	27000	31900
22	31000	11100	17200	11300	13000	10200	26200	24500	27300	29300	27000	31200
23	31200	11100	17500	11600	12200	10100	26600	33600	27400	29000	27300	31000
24	31000	11100	16500	11400	11900	10000	26900	32600	29900	29400	28600	31000
25	30700	11100	16400	11100	12800	10200	27300	30400	25600	28000	28600	30800
26	29800	11200	15500	11000	13900	11700	27200	31900	25900	28100	28200	30700
27	27200	11200	15500	11100	14000	14000	27100	26900	29500	28200	28000	30500
28	24700	11100	14000	11500	12900	16700	27400	27000	26000	25600	27800	30000
29	21800	11000	12500	12500	---	19500	27500	30100	28300	28600	27700	30200
30	19400	12500	12500	12800	---	22100	27500	26000	33500	26700	27800	29800
31	16900	--	12500	13400	---	22700	---	26600	--	26000	28100	--
TOTAL	905500	351500	445600	383200	380400	373360	768900	861500	847400	871500	847600	929000
MEAN	29210	11720	14370	12360	13590	12040	25630	27790	28250	28110	27340	30970
MAX	31200	14800	18300	13400	16000	22700	27500	36500	34700	32000	28600	32700
MIN	16900	10900	11500	11000	11800	9920	22800	23700	25200	25600	25500	28500
AC-FT	1796000	697200	883800	760100	754500	740600	1525000	1709000	1681000	1729000	1681000	1843000

CAL YR 1989 TOTAL 8849700 MEAN 24250 MAX 36400 MIN 8290 AC-FT 17550000
WTR YR 1990 TOTAL 7965460 MEAN 21820 MAX 36500 MIN 9920 AC-FT 15800000

MONONA-HARRISON DITCH BASIN

06602020 WEST FORK DITCH AT HORNICK, IA

LOCATION.--Lat $42^{\circ}13'37''$, long $96^{\circ}04'40''$, in SW $\frac{1}{4}$ sec. 27, T. 86 N., R. 45 W., Woodbury County, Hydrologic Unit 10230004, on left bank at upstream side of State Highway 141 bridge, 1.0 mi east of Hornick, 9.2 mi upstream from Wolf Creek, and 13.5 mi north of Onawa.

DRAINAGE AREA.--403 mi².

PERIOD OF RECORD.--April 1939 to September 1969 (published as "at Holly Springs"), July 1974 to current year.

REVISED RECORDS.--WSP 1240: 1943, 1945 (M). WSP 1310: 1941 (M) 1944-46 (M). WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,045.82 ft above NGVD. Prior to June 16, 1959, nonrecording gage at site 3.0 mi upstream and June 16, 1959 to Sept. 30, 1969, recording gage at site 2.2 mi upstream at datum 7.0 ft higher.

REMARKS.--Estimated daily discharges: Nov. 16 to Mar. 3, Mar. 6, 7, and July 16-31. Records good except those for estimated daily discharges, which are poor. West Fork ditch is a dredged channel which diverts flow of West Fork Little Sioux River at Holly Springs 5.5 mi south, then southeast 6.5 mi to a point 1.2 mi west of Kennebec, where Wolf Creek enters from left. From this point, ditch roughly parallels the Little Sioux River and is known as Monona-Harrison ditch. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height tele-meter at station.

AVERAGE DISCHARGE.--46 years (water years 1940-69, 1975-90), 109 ft³/s, 3.67 in/yr, 78,970 acre-ft/yr; median of yearly mean discharges, 86 ft³/s, 2.9 in/yr, 62,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,400 ft³/s Mar. 28, 1962, gage height, 22.46 ft, site and datum then in use; maximum gage height, 25.2 ft Mar. 30, 1960, from floodmark, site and datum then in use; minimum daily discharge, 0.2 ft³/s July 30, Aug. 17, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,800 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 19	1300	*5,810	*20.47	June 17	1200	2,820	17.18
May 23	1700	3,040	17.49				

Minimum daily discharge, 11 ft³/s, Dec. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	21	21	13	19	21	28	26	133	224	69	36
2	19	21	18	14	17	24	26	26	143	178	65	37
3	18	21	17	16	17	27	26	24	136	154	62	42
4	19	21	18	16	18	30	24	24	125	145	60	48
5	22	22	20	15	20	30	23	23	114	145	57	39
6	21	22	18	15	22	28	23	23	105	133	53	36
7	21	22	18	17	24	28	23	23	100	124	51	34
8	21	22	17	19	22	32	23	22	98	117	50	34
9	21	21	17	19	21	48	25	30	95	109	48	34
10	21	21	16	20	23	58	30	40	88	114	47	34
11	21	21	15	19	25	53	29	36	84	136	51	33
12	20	21	15	20	30	47	26	36	79	129	53	32
13	21	21	15	22	25	42	26	37	212	144	49	31
14	20	21	14	25	15	45	27	35	109	133	45	30
15	20	21	13	28	15	41	26	37	188	130	43	29
16	20	17	14	30	13	39	26	39	1270	120	42	28
17	19	19	14	29	13	37	26	47	2050	110	43	29
18	19	20	15	27	14	35	24	42	840	105	42	31
19	20	21	14	24	14	33	24	2710	288	101	39	33
20	20	23	13	22	15	31	24	508	233	210	43	33
21	20	25	12	20	17	32	23	152	171	150	43	31
22	21	20	11	21	19	31	22	110	177	120	42	28
23	21	19	11	23	20	30	23	1750	157	105	41	27
24	21	20	12	21	18	29	36	1240	141	100	114	28
25	21	21	12	20	18	29	41	610	125	130	88	28
26	21	22	12	22	19	28	36	705	114	140	57	28
27	20	18	12	23	20	27	30	283	105	150	48	27
28	20	15	13	24	20	27	27	214	187	170	43	26
29	21	15	14	24	---	27	26	178	1000	520	40	27
30	21	18	14	22	---	27	27	156	355	120	38	26
31	21	---	13	21	---	27	---	141	---	75	37	---
TOTAL	631	612	458	651	533	1043	800	9327	9022	4541	1603	959
MEAN	20.4	20.4	14.8	21.0	19.0	33.6	26.7	301	301	146	51.7	32.0
MAX	22	25	21	30	30	58	41	2710	2050	520	114	48
MIN	18	15	11	13	13	21	22	22	79	75	37	26
AC-FT	1250	1210	908	1290	1060	2070	1590	18500	17900	9010	3180	1900
CFSM	.05	.05	.04	.05	.05	.08	.07	.75	.75	.36	.13	.08
IN.	.06	.06	.04	.06	.05	.10	.07	.86	.83	.42	.15	.09

CAL YR 1989 TOTAL 17653 MEAN 48.4 MAX 1300 MIN 11 AC-FT 35010 CFSM .12 IN. 1.63
WTR YR 1990 TOTAL 30180 MEAN 82.7 MAX 2710 MIN 11 AC-FT 59860 CFSM .21 IN. 2.79

MONONA-HARRISON DITCH BASIN

193

06602400 MONONA-HARRISON DITCH NEAR TURIN, IA

LOCATION.--Lat $41^{\circ}57'52''$, long $95^{\circ}59'30''$, in NW1/4 NE1/4 sec.32, T.83 N., R.44 W., Monona County, Hydrologic Unit 10230004, on left pier at downstream side of bridge on county highway E54, 1.0 mi west of gaging station on Little Sioux River near Turin, 4 mi southwest of Turin, 5.2 mi northeast of Blencoe, and 12.5 mi upstream from mouth.

DRAINAGE AREA.--900 mi².

PERIOD OF RECORD.--April 1939 to current year. Records for April 1939 to January 1958 not equivalent owing to diversion from Little Sioux River through equalizer ditch 1.5 mi upstream. Prior to May 1942, published as "near Blencoe".

GAGE.--Water-stage encoder. Datum of gage is 1,015.00 ft above NGVD (U.S. Army Corps of Engineers bench mark). Prior to May 7, 1942, nonrecording gage at site 4.8 mi downstream at datum 5.40 ft lower. May 7, 1942 to Oct. 13, 1953, nonrecording gage and Oct. 14, 1953 to Sept. 30, 1975, recording gage at same site at datum 5.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 16-18, 23-25, 27-30, Dec. 2-4, Dec. 7 to Jan. 1, Jan. 4-6, 12, 13, 19-22, 25, 26, Jan. 28 to Feb. 5, Feb. 8-11, 14-22, and Mar. 6, 7. Records good except those for estimated daily discharges, which are poor. Monona-Harrison ditch is a dug channel and is a continuation of West Fork Ditch, paralleling the Little Sioux River, and discharging into the Missouri River 1.5 mi upstream from the mouth of the Little Sioux River. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--32 years (water years 1959-90), 244 ft³/s, 3.68 in/yr, 176,800 acre-ft/yr; median of yearly mean discharges, 200 ft³/s, 3.0 in/yr, 145,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,900 ft³/s Feb. 19, 1971, gage height, 28.03 ft, present datum; minimum discharge, 7.6 ft³/s Jan. 12, 1990, result of freeze-up.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 19	1900	*8,600	*20.28	June 17	1200	6,720	20.02
May 23	2200	6,360	19.11				

Minimum daily discharge, 21 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	43	46	26	35	56	69	56	230	219	208	90
2	47	42	44	31	30	59	66	54	229	184	165	93
3	45	42	38	32	31	60	63	52	270	168	144	98
4	46	43	45	30	37	65	63	52	220	153	132	107
5	54	44	52	27	43	67	60	51	206	157	122	98
6	55	44	54	27	50	64	58	50	190	147	114	91
7	52	50	42	29	49	66	58	52	181	139	110	86
8	51	46	37	31	44	71	58	53	184	134	108	84
9	53	43	43	30	43	97	62	58	186	133	105	83
10	52	41	40	32	43	172	72	100	176	134	105	83
11	51	44	34	30	45	134	81	90	165	140	110	81
12	49	46	30	27	58	120	68	78	157	127	114	79
13	49	43	35	29	50	114	67	80	723	120	112	78
14	46	42	28	33	29	123	68	77	490	113	109	75
15	46	43	25	33	30	117	73	74	1650	110	105	73
16	44	35	28	32	25	101	69	86	3980	108	102	72
17	43	37	32	33	24	96	69	90	6260	105	105	72
18	43	38	35	32	27	89	70	91	4110	102	109	77
19	45	40	33	30	30	82	66	4110	1660	99	101	84
20	47	45	32	28	35	79	66	3190	793	378	98	86
21	49	44	24	27	43	79	65	684	466	212	104	80
22	50	42	21	29	50	78	60	287	499	122	99	74
23	50	40	21	33	55	75	58	3060	337	104	97	70
24	49	42	22	32	47	73	66	4680	257	104	236	70
25	49	43	23	30	58	71	79	2510	221	159	237	72
26	49	45	23	31	75	70	77	1580	196	206	140	71
27	46	35	24	32	64	69	65	894	179	232	119	70
28	45	30	29	35	56	70	57	607	167	247	106	70
29	44	30	31	39	---	69	56	394	685	1460	98	69
30	44	37	30	42	---	70	55	291	402	687	95	69
31	44	---	28	50	---	69	---	246	---	311	93	---
TOTAL	1485	1239	1029	983	1206	2625	1964	23777	25469	6814	3802	2405
MEAN	47.9	41.3	33.2	31.7	43.1	84.7	65.5	767	849	220	123	80.2
MAX	55	50	54	50	75	172	81	4680	6260	1460	237	107
MIN	43	30	21	26	24	56	55	50	157	99	93	69
AC-FT	2950	2460	2040	1950	2390	5210	3900	47160	50520	13520	7540	4770
CFSM	.05	.05	.04	.04	.05	.09	.07	.85	.94	.24	.14	.09
IN.	.06	.05	.04	.04	.05	.11	.08	.98	1.05	.28	.16	.10

CAL YR 1989 TOTAL 37715 MEAN 103 MAX 3790 MIN 21 AC-FT 74810 CFSM .11 IN. 1.56
WTR YR 1990 TOTAL 72798 MEAN 199 MAX 6260 MIN 21 AC-FT 144400 CFSM .22 IN. 3.01

LITTLE SIOUX RIVER BASIN
06604000 SPIRIT LAKE NEAR ORLEANS, IA

LOCATION.--Lat 43°28'11", long 95°07'25", in NE1/4 NW1/4 sec.20, T.100N., R.36W., Dickinson County, Hydrologic Unit 10230003, 2.3 mi upstream from lake outlet and 2.3 mi northwest of Orleans.

DRAINAGE AREA.--75.6 mi².

PERIOD OF RECORD.--May 1933 to September 1975, (fragmentary prior to 1951). April 1990 to current year. Prior to October 1949, published as "at Orleans".

GAGE.--Water-stage recorder. Datum of gage is 1,387.25 ft above mean sea level, 90.0 ft above Iowa Lake Survey datum, and 14.2 ft below crest of spillway. Prior to July 6, 1950, non-recording gage or water-stage recorder at various sites near outlet, all at present datum.

REMARKS.--No gage-height record May 9 to June 9. Lake formed by concrete dam with ungated spillway at elevation 1,401.4 ft above mean sea level. Dam constructed in 1969. A previous outlet works had been constructed in 1944. Lake is used for conservation and recreation.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 15.74 ft June 19, 1944; minimum observed, 6.75 ft Oct. 20, 1935.

EXTREMES FOR CURRENT YEAR.--Maximum gage height (April to September), 11.48 ft June 18; minimum, 10.47 ft Sept. 30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	11.29	11.21	---	11.38	11.10	10.95
2	---	---	---	---	---	---	11.28	11.20	---	11.35	11.08	10.94
3	---	---	---	---	---	---	11.27	11.20	---	11.34	11.08	10.91
4	---	---	---	---	---	---	11.27	11.19	---	11.33	11.06	10.90
5	---	---	---	---	---	---	11.25	11.18	---	11.30	11.03	10.89
6	---	---	---	---	---	---	11.23	11.16	---	11.26	11.01	10.88
7	---	---	---	---	---	---	11.23	11.14	---	11.25	10.99	10.87
8	---	---	---	---	---	---	11.22	11.14	---	11.24	10.96	10.85
9	---	---	---	---	---	---	11.23	---	---	11.22	10.94	10.84
10	---	---	---	---	---	---	11.21	---	11.19	11.21	10.94	10.83
11	---	---	---	---	---	---	11.19	---	11.23	11.24	10.95	10.81
12	---	---	---	---	---	---	11.19	---	11.23	11.20	10.93	10.79
13	---	---	---	---	---	---	11.19	---	11.23	11.18	10.91	10.76
14	---	---	---	---	---	---	11.18	---	11.24	11.17	10.88	10.72
15	---	---	---	---	---	---	11.19	---	11.34	11.15	10.88	10.69
16	---	---	---	---	---	---	11.19	---	11.37	11.13	10.87	10.67
17	---	---	---	---	---	---	11.18	---	11.42	11.12	10.87	10.64
18	---	---	---	---	---	---	11.16	---	11.48	11.18	10.88	10.64
19	---	---	---	---	---	---	11.15	---	11.47	11.23	11.02	10.64
20	---	---	---	---	---	---	11.16	---	11.46	11.22	11.02	10.63
21	---	---	---	---	---	---	11.16	---	11.45	11.20	11.02	10.61
22	---	---	---	---	---	---	11.15	---	11.44	11.18	11.01	10.58
23	---	---	---	---	---	---	11.16	---	11.43	11.16	11.00	10.55
24	---	---	---	---	---	---	11.18	---	11.42	11.15	11.01	10.53
25	---	---	---	---	---	---	11.18	---	11.42	11.13	11.01	10.52
26	---	---	---	---	---	---	11.19	---	11.40	11.15	11.01	10.52
27	---	---	---	---	---	---	11.20	---	11.42	11.15	11.01	10.51
28	---	---	---	---	---	11.30	11.19	---	11.42	11.15	11.01	10.50
29	---	---	---	---	---	11.30	11.24	---	11.41	11.16	11.00	10.48
30	---	---	---	---	---	11.30	11.23	---	11.40	11.14	10.98	10.47
31	---	---	---	---	---	11.29	---	---	---	11.12	10.95	---

06604200 WEST OKOBONI LAKE AT LAKESIDE LABORATORY NEAR MILFORD, IA

LOCATION.--Lat $43^{\circ}22'43''$, long $95^{\circ}10'52''$, in NE1/4 SW1/4 sec.23, T.99N., R.37W., Dickinson County, Hydrologic Unit 10230003, at pumping station of Lakeside Laboratory on west shore, 2.3 mi upstream from lake outlet and 3.8 mi northwest of Milford.

DRAINAGE AREA.--125 mi².

PERIOD OF RECORD.--May 1933 to current year. Published as "Okoboji Lake at Arnold's Park" 1933-37 and as "Okoboji Lake at Lakeside Laboratory near Milford" 1937-66.

GAGE.--Water-stage recorder. Datum of gage is 1,391.76 ft above NGVD, 94.51 ft above Iowa Lake Survey datum, and about 4.0 ft below crest of spillway. Prior to June 17, 1938, nonrecording gage at State Pier at Arnolds Park at same datum.

REMARKS.--No gage-height record Dec. 15 to Mar. 28. Lake formed by concrete dam with ungated spillway at elevation 1,395.8 ft above NGVD. Lake is used for conservation and recreation. Area of lake is approximately 3,900 acres.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 6.28 ft June 22, 1984; minimum observed, 0.20 ft Sept. 20, 1959.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 2.62 ft June 28; minimum, 1.76 ft Dec. 2, Apr. 23.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.40	2.07	1.81	---	---	---	1.94	1.92	2.15	2.56	2.33	2.43
2	2.38	2.06	1.80	---	---	---	1.94	1.91	2.16	2.55	2.32	2.42
3	2.36	2.06	1.80	---	---	---	1.92	1.91	2.18	2.52	2.31	2.40
4	2.34	2.05	1.79	---	---	---	1.92	1.90	2.18	2.52	2.31	2.39
5	2.33	2.04	1.79	---	---	---	1.91	1.90	2.17	2.50	2.28	2.38
6	2.31	2.04	1.79	---	---	---	1.90	1.88	2.17	2.47	2.25	2.37
7	2.30	2.04	1.79	---	---	---	1.89	1.86	2.17	2.44	2.23	2.36
8	2.28	2.03	1.79	---	---	---	1.88	1.87	2.16	2.43	2.21	2.34
9	2.27	2.02	1.79	---	---	---	1.88	1.96	2.15	2.42	2.19	2.33
10	2.26	2.01	1.79	---	---	---	1.89	1.96	2.15	2.41	2.19	2.32
11	2.24	2.00	1.78	---	---	---	1.86	1.95	2.14	2.40	2.18	2.30
12	2.23	2.00	1.78	---	---	---	1.85	1.96	2.15	2.43	2.17	2.28
13	2.22	1.99	1.78	---	---	---	1.85	1.95	2.22	2.39	2.14	2.26
14	2.22	1.98	1.78	---	---	---	1.85	1.96	2.22	2.37	2.11	2.23
15	2.22	1.97	---	---	---	---	1.86	1.98	2.22	2.36	2.11	2.21
16	2.22	1.96	---	---	---	---	1.87	2.02	2.26	2.34	2.10	2.18
17	2.20	1.95	---	---	---	---	1.86	1.98	2.39	2.32	2.10	2.15
18	2.19	1.94	---	---	---	---	1.84	1.99	2.42	2.34	2.12	2.15
19	2.18	1.93	---	---	---	---	1.83	2.11	2.51	2.44	2.33	2.16
20	2.16	1.91	---	---	---	---	1.83	2.15	2.55	2.44	2.40	2.15
21	2.15	1.88	---	---	---	---	1.84	2.15	2.56	2.43	2.45	2.13
22	2.14	---	---	---	---	---	1.83	2.15	2.58	2.40	2.44	2.10
23	2.12	---	---	---	---	---	1.84	2.17	2.57	2.39	2.45	2.07
24	2.12	1.84	---	---	---	---	1.88	2.18	2.56	2.38	2.47	2.03
25	2.11	1.83	---	---	---	---	1.88	2.19	2.56	2.36	2.49	2.03
26	2.10	1.83	---	---	---	---	1.88	2.19	2.56	2.37	2.49	2.02
27	2.09	1.83	---	---	---	---	1.90	2.19	2.55	2.38	2.48	2.02
28	2.09	1.82	---	---	---	---	1.89	2.20	2.57	2.38	2.49	2.00
29	2.09	1.81	---	---	---	1.96	1.93	2.18	2.57	2.39	2.47	1.98
30	2.09	1.82	---	---	---	1.94	1.93	2.18	2.57	2.37	2.46	1.97
31	2.08	---	---	---	---	1.94	---	2.16	---	2.35	2.43	---
MEAN	2.21	---	---	---	---	---	1.88	2.03	2.35	2.41	2.31	2.21
MAX	2.40	---	---	---	---	---	1.94	2.20	2.58	2.56	2.49	2.43
MIN	2.08	---	---	---	---	---	1.83	1.86	2.14	2.32	2.10	1.97

LITTLE SIOUX RIVER BASIN

06605000 OCHEYEDAN RIVER NEAR SPENCER, IA

LOCATION.--Lat 43°07'44", long 95°12'37", in SW1/4SW1/4 sec.15, T.96N., R.37W., Clay County, Hydrologic Unit 10230003, on left bank 3 ft upstream from bridge on county highway M38, 3.4 mi west by southwest of Spencer, and at mile 4.1.

DRAINAGE AREA.--426 mi².

PERIOD OF RECORD.--October 1977 to current year. Occasional low-flow measurements, water years 1957-61, 1964, 1966-68, 1970, 1971, 1974-77.

GAGE.--Water-stage recorder. Datum of gage is 1,311.66 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 11 to Mar. 25, and Mar. 28 to May 8. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--13 years, 218 ft³/s, 6.95 in/yr, 157,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,450 ft³/s June 21, 1983, gage height, 10.49 ft; no flow Jan. 24 to Mar. 9, 1979, and Dec. 22, 1989 to Jan. 5, 1990.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 8, 1953 reached a stage of 12.89 ft, discharge, 26,000 ft³/s on basis of contracted-opening measurement of peak flow.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 18	1030	*999	*6.44			No other peak greater than base discharge.	

Minimum discharge, no flow Dec. 22 to Jan. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	10	6.0	.00	2.5	3.3	23	21	77	222	80	33
2	9.2	9.9	5.0	.00	2.3	3.5	23	21	84	194	69	31
3	8.8	12	5.4	.00	2.1	4.2	22	22	145	166	61	29
4	9.1	11	5.6	.00	2.8	3.7	21	23	138	142	56	27
5	10	11	5.4	.00	3.3	5.0	20	24	124	124	49	24
6	10	12	5.0	.30	3.7	4.8	19	23	114	112	43	23
7	9.9	11	4.5	.90	3.8	4.9	19	22	100	105	40	23
8	9.6	11	4.8	2.5	3.2	4.7	19	21	92	97	37	22
9	9.4	11	5.0	2.4	3.5	5.2	20	27	83	88	35	22
10	8.7	12	4.2	2.8	4.5	6.8	20	40	74	83	34	21
11	8.5	8.0	2.5	2.2	4.8	7.4	19	43	67	80	33	20
12	8.4	7.6	1.5	1.9	5.1	10	19	45	66	87	31	19
13	8.1	7.4	1.0	1.8	5.8	13	20	42	70	85	29	17
14	8.2	7.2	.70	2.1	3.9	11	21	40	67	76	28	15
15	8.0	6.8	.60	2.5	3.0	10	21	39	64	67	27	14
16	8.1	6.6	.50	2.4	2.5	9.6	21	55	69	61	25	13
17	8.0	6.0	.40	2.3	2.5	9.4	21	61	546	55	24	13
18	7.9	6.0	.37	2.2	2.0	9.0	21	59	904	55	24	17
19	8.0	7.2	.30	2.3	1.7	8.4	20	85	707	73	36	20
20	8.3	8.2	.20	2.5	1.9	9.5	20	164	897	119	60	18
21	8.8	7.2	.14	2.7	2.1	18	19	194	575	125	87	17
22	8.9	6.2	.00	3.0	3.0	25	18	158	454	103	99	15
23	9.0	5.6	.00	3.4	5.0	29	20	143	415	87	82	14
24	9.2	6.2	.00	3.5	4.0	33	21	133	337	76	90	13
25	9.7	6.5	.00	3.5	2.5	30	23	126	280	70	106	13
26	11	6.5	.00	3.3	2.3	31	22	123	238	64	95	14
27	9.2	6.0	.00	3.0	2.5	28	21	116	205	62	72	12
28	10	5.6	.00	3.5	3.0	25	21	106	262	59	58	13
29	11	5.4	.00	3.4	---	24	20	96	357	75	49	12
30	11	6.2	.00	3.2	---	23	20	88	281	122	41	13
31	11	---	.00	2.8	---	24	---	81	---	100	36	---
TOTAL	286.0	243.3	59.11	66.40	89.3	433.4	614	2241	7892	3034	1636	557
MEAN	9.23	8.11	1.91	2.14	3.19	14.0	20.5	72.3	263	97.9	52.8	18.6
MAX	11	12	6.0	3.5	5.8	33	23	194	904	222	106	33
MIN	7.9	5.4	.00	.00	1.7	3.3	18	21	64	55	24	12
AC-FT	567	483	117	132	177	860	1220	4450	15650	6020	3250	1100
CFSM	.02	.02	.00	.01	.01	.03	.05	.17	.62	.23	.12	.04
IN.	.02	.02	.01	.01	.01	.04	.05	.20	.69	.26	.14	.05

CAL YR 1989 TOTAL 10762.31 MEAN 29.5 MAX 594 MIN .00 AC-FT 21350 CFSM .07 IN. .94
WTR YR 1990 TOTAL 17151.51 MEAN 47.0 MAX 904 MIN .00 AC-FT 34020 CFSM .11 IN. 1.50

LITTLE SIOUX RIVER BASIN

197

06605850 LITTLE SIOUX RIVER AT LINN GROVE, IA

LOCATION.--Lat. 42°53'24", long 95°14'30", in SW1/4 SW1/4 sec.5, T.93 N., R.37 W., Buena Vista County, Hydrologic Unit 10230003, on right bank at downstream side of bridge on State Highway 264, in Linn Grove, and at mile 123.7.

DRAINAGE AREA.--1,548 mi².

PERIOD OF RECORD.--October 1972 to current year.

REVISED RECORDS.--WDR IA-80-1: 1978-79.

GAGE.--Water-stage recorder. Datum of gage is 1,223.60 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 11-14, Nov. 22 to Dec. 25, Jan. 12-14, Jan. 18 to Feb. 6, Feb. 16-20, and Aug. 15-20. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--18 years, 663 ft³/s, 5.82 in/yr, 480,300 acre-ft/yr; median of yearly mean discharges, 650 ft³/s, 5.7 in/yr, 471,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft³/s June 17, 1984, gage height, 19.58 ft; maximum gage height, 19.58 ft June 17, 1984; minimum daily discharge, 0.70 ft³/s Feb. 4, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge	Gage height	Date	Discharge	Gage height
		(ft ³ /s)	(ft)		(ft ³ /s)	(ft)
June 21	1100	*2,190	*11.36		No other peak greater than base discharge.	

Minimum dialy discharge, 3.1 ft³/s Dec. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	32	11	4.8	11	25	96	72	302	933	528	148
2	15	31	12	5.1	10	25	96	76	280	771	480	138
3	15	32	10	5.1	9.6	23	92	79	278	653	435	127
4	16	31	11	5.1	10	26	91	86	333	556	387	117
5	18	31	12	5.4	11	29	88	86	422	472	329	108
6	18	32	9.5	5.7	12	31	82	86	464	403	279	100
7	17	36	9.0	5.7	12	33	80	83	433	353	237	93
8	18	36	9.8	5.7	12	34	78	80	393	318	203	88
9	18	33	11	5.7	12	38	79	93	356	282	178	84
10	18	28	6.0	5.9	14	42	84	124	319	253	165	79
11	18	24	5.0	7.4	14	57	81	157	281	243	152	77
12	18	25	5.4	9.0	15	89	75	173	257	243	137	73
13	19	25	4.6	8.2	17	117	74	177	249	243	124	66
14	19	26	3.8	10	28	114	74	175	228	234	116	63
15	20	26	3.9	11	20	113	74	166	231	212	117	59
16	19	26	4.2	12	18	104	75	163	258	190	105	55
17	19	20	4.0	13	19	99	73	172	537	171	101	55
18	19	18	3.8	11	17	90	73	193	1050	160	97	54
19	20	16	3.6	11	16	86	70	219	1580	169	120	58
20	27	17	3.4	12	15	78	69	274	1970	203	145	62
21	28	18	3.1	12	16	75	68	390	2170	255	169	61
22	29	17	3.3	13	17	86	66	499	2120	372	215	57
23	29	16	3.7	13	17	96	68	543	2030	434	259	50
24	30	16	4.0	13	23	97	73	532	1850	461	260	46
25	31	17	4.1	12	21	101	82	528	1650	458	281	44
26	32	18	4.3	11	21	110	79	506	1480	435	375	43
27	32	22	4.5	12	21	113	77	474	1270	397	337	43
28	33	11	4.3	13	23	114	71	445	1160	390	276	41
29	33	11	4.7	13	---	108	71	408	1160	549	226	37
30	35	13	4.7	12	---	101	71	371	1070	500	192	36
31	35	---	4.7	12	---	98	---	334	---	484	166	---
TOTAL	715	704	188.4	294.8	451.6	2352	2330	7764	26181	11797	7191	2162
MEAN	23.1	23.5	6.08	9.51	16.1	75.9	77.7	250	873	381	232	72.1
MAX	35	36	12	13	28	117	96	543	2170	933	528	148
MIN	15	11	3.1	4.8	9.6	23	66	72	228	160	97	36
AC-FT	1420	1400	374	585	896	4670	4620	15400	51930	23400	14260	4290
CFSM	.01	.02	.00	.01	.01	.05	.05	.16	.56	.25	.15	.05
IN.	.02	.02	.00	.01	.01	.06	.06	.19	.63	.28	.17	.05

CAL YR 1989 TOTAL 33338.4 MEAN 91.3 MAX 900 MIN 3.1 AC-FT 66130 CFSM .06 IN. .80
WTR YR 1990 TOTAL 62130.8 MEAN 170 MAX 2170 MIN 3.1 AC-FT 123200 CFSM .11 IN. 1.49

LITTLE SIOUX RIVER BASIN

06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IA

LOCATION.--Lat 42°28'20", long 95°47'49", in NE1/4 NW1/4 sec.1, T.88 N., R.43 W., Woodbury County, Hydrologic Unit 10230003 on right bank 50 ft upstream from bridge on State Highway 31, 0.3 mi upstream from Bacon Creek, 0.5 mi west of Correctionville, 0.8 mi downstream from Pierson Creek, and at mile 56.0.

DRAINAGE AREA.--2,500 mi².

PERIOD OF RECORD.--May 1918 to July 1925, October 1928 to July 1932, June 1936 to current year. Monthly discharge only for some periods, published in WSP 1310.

REVISED RECORDS.--WSP 856: 1919.. WSP 1240: 1924-25, 1931, 1932 (M), 1937, 1945 (M), 1947 (M), 1949 (M). WSP 1440: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,096.49 ft above NGVD. May 28, 1918, to July 1, 1925 and Oct. 29, 1928 to July 15, 1929, nonrecording gage 0.2 mi downstream at datum 1.25 ft lower. July 16, 1929, to July 2, 1932, and June 15, 1936, to Nov. 7, 1938, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Nov. 27-29, Dec. 6-25, Dec. 31 to Jan. 8, Jan. 13, 14, and Jan. 19 to Mar. 9. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--63 years (water years 1919-24, 1929-31, 1937-90), 814 ft³/s, 4.42 in/yr, 589,700 acre-ft/yr; median of yearly mean discharges, 640 ft³/s, 3.5 in/yr, 464,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,800 ft³/s Apr. 7, 1965, gage height, 25.86 ft; minimum daily discharge, 2.6 ft³/s July 17, 25, 1936, caused by construction dam above gage; minimum daily discharge excluding regulation, 4.0 ft³/s Oct. 9, 12, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 23 or 24, 1891, reached a stage of 29.34 ft, present datum, from levels to floodmark by U.S. Soil Conservation Service (discharge not determined).

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 19	0700	4,600	13.10	June 17	0500	4,830	13.38
June 16	1200	*4,880	*13.44				

Minimum discharge, 12 ft³/s Nov. 23, result of freeze-up.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	49	56	41	17	34	64	214	159	774	2110	878	332
2	45	56	41	18	34	70	205	159	929	1880	840	324
3	42	58	35	20	36	76	193	157	1190	1640	825	339
4	43	61	36	22	37	79	189	155	932	1430	762	299
5	51	63	43	21	39	76	182	154	908	1290	689	264
6	50	63	47	20	41	74	172	154	852	1120	625	239
7	47	64	39	22	43	80	169	155	853	1000	558	220
8	46	62	37	24	44	95	168	155	861	911	501	207
9	47	62	41	27	43	140	170	181	810	823	451	194
10	47	61	35	29	47	216	196	226	739	772	413	183
11	45	62	27	30	52	209	191	238	682	716	392	173
12	44	62	25	28	54	231	179	273	623	689	366	167
13	43	64	28	29	44	253	178	312	1000	712	340	155
14	44	65	22	30	36	269	179	321	754	642	318	143
15	45	64	20	31	40	270	176	326	755	599	297	136
16	43	31	21	32	35	271	172	366	3710	563	279	128
17	42	36	23	34	34	266	167	328	3910	523	273	125
18	42	26	24	35	35	257	167	311	2880	486	260	140
19	42	41	23	33	38	243	164	2860	2650	489	243	161
20	44	53	18	31	41	230	164	1050	2980	539	248	148
21	47	43	14	29	45	223	163	759	3680	650	286	143
22	47	46	13	30	51	226	159	757	3270	591	281	135
23	48	32	13	32	58	224	157	1600	3130	581	316	129
24	50	50	14	33	52	230	172	1290	2960	652	420	124
25	51	57	15	32	54	232	177	1250	2730	730	445	119
26	51	46	14	32	60	229	179	1400	2500	789	457	115
27	52	30	15	34	62	222	173	1160	2300	777	444	111
28	51	19	16	37	58	220	167	1090	2630	820	479	110
29	56	35	19	39	---	219	167	982	2880	1120	465	105
30	56	41	19	39	---	219	163	897	2530	874	418	104
31	56	--	18	37	---	218	--	829	--	961	369	--
TOTAL	1466	1509	796	907	1247	5331	5272	20054	57402	27479	13938	5272
MEAN	47.3	50.3	25.7	29.3	44.5	191	176	647	1913	886	450	176
MAX	56	65	47	39	62	271	214	2860	3910	2110	878	339
MIN	42	19	13	17	34	64	157	154	623	486	243	104
AC-FT	2910	2990	1580	1800	2470	11760	10460	39780	113900	54500	27650	10460
CFSM	.02	.02	.01	.01	.02	.08	.07	.26	.77	.35	.18	.07
IN.	.02	.02	.01	.01	.02	.09	.08	.30	.85	.41	.21	.08

CAL YR 1989	TOTAL	71402	MEAN	196	MAX	2250	MIN	13	AC-FT	141600	CFSM	.08	IN.	1.06
WTR YR 1990	TOTAL	141273	MEAN	387	MAX	3910	MIN	13	AC-FT	280200	CFSM	.15	IN.	2.10

LITTLE SIOUX RIVER BASIN

199

06607200 MAPLE RIVER AT MAPLETON, IA

LOCATION.--Lat 42°09'25", long 95°48'35", in SE1/4 SE1/4 sec.23, T.85 N., R.43 W., Monona County, Hydrologic Unit 10230005, on right bank at downstream side of bridge on State Highway 175, 1.0 mi downstream from Simmons Creek, 1.1 mi southwest of intersection of State Highways 175 and 141 in Mapleton, 2.1 mi upstream from McCleery Creek, and 16.0 mi upstream from mouth.

DRAINAGE AREA.--669 mi².

PERIOD OF RECORD.--October 1941 to current year.

REVISED RECORDS.--WSP 1310: 1942 (M), 1946 (M), 1948 (M). WSP 1440: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,085.86 ft above NGVD. See WSP 1730 for history of changes prior to Sept. 20, 1956.

REMARKS.--Estimated daily discharges: Nov. 16-18, 23, 24, Nov. 27 to Feb. 26, and July 21-23. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--49 years, 267 ft³/s, 5.42 in/yr, 193,400 acre-ft/yr; median of yearly mean discharges, 240 ft³/s, 4.9 in/yr, 174,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,800 ft³/s Sept. 12, 1978, gage height, 16.74 ft; maximum gage height, 22.1 ft June 12, 1950; no flow Sept. 21, 22, 1945 caused by temporary dam above gage; minimum daily discharge excluding regulation, 2.5 ft³/s Feb. 17-20, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 19	1400	7,200	9.73	June 13	2000	5,030	7.80
May 24	1100	4,300	7.13	June 17	0100	*12,500	*13.76

Minimum daily discharge, 20 ft³/s, Dec. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	47	48	54	25	31	47	136	103	508	701	428	183
2	44	48	50	28	28	53	128	102	491	611	394	188
3	44	48	45	31	29	56	121	101	547	562	390	202
4	44	50	48	29	32	53	118	100	520	512	356	195
5	50	49	52	27	36	53	114	100	475	505	324	180
6	50	49	49	26	40	52	110	100	441	480	298	172
7	48	49	45	27	46	53	108	98	407	455	285	163
8	47	49	42	29	43	66	108	95	417	429	273	156
9	46	48	44	31	41	151	109	107	403	407	263	156
10	45	47	40	32	40	122	118	128	362	401	255	152
11	44	47	35	35	42	104	124	154	339	426	248	146
12	43	46	30	34	50	96	117	179	325	384	242	142
13	43	47	33	36	45	126	118	176	3170	384	227	138
14	44	47	28	40	30	298	119	172	2050	377	219	131
15	44	46	25	46	32	259	119	172	1850	355	211	127
16	43	38	27	50	29	215	118	170	7420	339	206	123
17	43	40	28	48	28	195	116	187	10900	320	203	120
18	43	52	28	45	30	184	112	183	3500	306	200	132
19	44	61	24	41	32	184	110	4820	1860	361	193	149
20	44	53	23	37	35	180	111	2160	1500	476	190	139
21	45	48	21	33	40	178	111	985	1240	400	244	128
22	45	44	20	35	45	189	109	732	1710	350	208	119
23	45	43	20	38	50	193	107	1430	1390	320	198	115
24	45	58	21	36	45	187	106	2480	1030	300	306	114
25	46	56	23	34	43	172	109	2160	865	355	526	114
26	48	61	22	36	50	160	108	1640	784	414	467	112
27	47	45	23	39	48	152	106	1050	701	433	276	111
28	47	37	26	42	46	147	106	816	811	546	238	110
29	49	35	28	43	---	146	106	698	1290	1570	218	110
30	49	45	27	36	---	141	104	608	901	680	202	109
31	49	---	26	34	---	142	---	543	---	504	189	---
TOTAL	1415	1434	1007	1103	1086	4354	3406	22549	48207	14663	8477	4236
MEAN	45.6	47.8	32.5	35.6	38.8	140	114	727	1607	473	273	141
MAX	50	61	54	50	50	298	136	4820	10900	1570	526	202
MIN	43	35	20	25	28	47	104	95	325	300	189	109
AC-FT	2810	2840	2000	2190	2150	8640	6760	44730	95620	29080	16810	8400
CFSM	.07	.07	.05	.05	.06	.21	.17	1.09	2.40	.71	.41	.21
IN.	.08	.08	.06	.06	.06	.24	.19	1.25	2.68	.82	.47	.24

CAL YR 1989 TOTAL 40249 MEAN 110 MAX 1500 MIN 20 AC-FT 79830 CFSM .16 IN. 2.24
WTR YR 1990 TOTAL 111937 MEAN 307 MAX 10900 MIN 20 AC-FT 222000 CFSM .46 IN. 6.22

LITTLE SIOUX RIVER BASIN

06607500 LITTLE SIOUX RIVER NEAR TURIN, IA

LOCATION.--Lat $41^{\circ}57'52''$, long $95^{\circ}58'21''$, in NW1/4 NE1/4 sec.33, T.83 N., R.44 W., Monona County, Hydrologic Unit 10230003, on left bank on downstream side of bridge on county highway E54, 1.0 mi east of gaging station on Monona-Harrison ditch near Turin, 2.5 mi downstream from Maple River, 3.8 mi south of Turin, 6.2 mi northeast of Blencoe, and at mile 13.5.

DRAINAGE AREA.--3,526 mi². Prior to Jan. 15, 1958, 4,426 mi², combined area above this station and Monona-Harrison ditch station 1.0 mi west.

PERIOD OF RECORD.--January 1958 to current year. April 1939 to May 1942 at site 4.7 mi downstream, published as "near Blencoe" June 1942 to January 1958 at site 1,200 ft east on old river channel; records not equivalent owing to diversion into Monona-Harrison ditch through equalizer ditch 1.5 mi upstream.

GAGE.--Water-stage encoder. Datum of gage is 1,019.85 ft above NGVD (U.S. Army Corps of Engineers bench mark). Prior to July 15, 1958, nonrecording gages near present site at different datums. July 15 to Sept. 3, 1958, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Nov. 16 to Mar. 3, and Mar. 6, 7. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--32 years (water years 1959-90), 1,375 ft³/s, 5.30 in/yr, 996,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,200 ft³/s June 21, 1983, gage height, 26.54 ft; maximum gage height, 27.44 ft Feb. 19, 1971, backwater from ice; minimum daily discharge, 17 ft³/s Jan. 18-20, Jan. 28 to Feb. 1, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 19	2100	10,500	17.68	June 17	0830	*19,100	*22.38
May 24	1730	6,010	14.31	June 23	0100	5,890	14.21
June 13	2300	5,950	14.26				

Minimum daily discharge, 43 ft³/s Dec. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	128	129	103	56	120	170	386	207	1540	2890	1630	630
2	115	127	105	56	115	175	355	199	1440	2540	1490	600
3	114	130	94	60	118	180	339	195	1700	2330	1490	602
4	113	134	96	68	125	189	322	195	1760	2140	1370	603
5	147	140	110	68	130	195	300	185	1580	2010	1210	541
6	141	136	120	64	135	190	288	180	1520	1890	1090	492
7	133	138	110	66	140	198	278	182	1400	1730	989	452
8	132	140	105	72	150	225	277	183	1420	1650	912	423
9	129	138	120	78	150	398	280	202	1460	1600	840	411
10	124	134	102	82	145	461	299	261	1290	1520	778	407
11	128	138	84	86	150	425	326	308	1190	1500	727	395
12	121	137	70	84	160	400	333	365	1100	1340	690	386
13	120	139	74	88	165	439	323	389	3190	1280	638	366
14	121	137	62	92	120	670	324	422	3660	1300	620	350
15	122	138	54	96	130	704	319	436	2640	1170	572	330
16	113	110	56	100	120	613	314	452	9340	1090	554	319
17	112	80	60	104	113	562	306	481	17800	1050	535	309
18	112	90	62	106	115	523	291	478	9520	983	520	329
19	113	74	58	100	118	509	288	4990	5560	926	501	360
20	117	110	52	96	123	488	275	5720	4320	1320	479	372
21	120	130	48	92	140	448	262	2140	5080	1140	525	355
22	122	120	43	95	153	433	260	1760	5280	1140	559	338
23	125	120	43	103	162	461	249	2500	5010	1030	537	320
24	124	100	45	102	155	463	250	4370	4140	1040	806	315
25	127	120	50	100	150	453	264	3710	3700	1260	968	310
26	131	130	48	98	155	441	267	2830	3290	1560	1220	300
27	131	130	52	104	166	429	254	2410	2870	1540	842	293
28	123	66	58	115	170	410	231	2090	2690	1570	757	285
29	130	84	62	125	---	401	225	1930	4000	2740	784	280
30	129	100	62	128	---	396	216	1780	3840	1980	753	283
31	129	---	58	126	---	389	---	1660	---	1660	706	---
TOTAL	3846	3599	2266	2810	3893	12438	8701	43210	113330	48919	26092	11756
MEAN	124	120	73.1	90.6	139	401	290	1394	3778	1578	842	392
MAX	147	140	120	128	170	704	386	5720	17800	2890	1630	630
MIN	112	66	43	56	113	170	216	180	1100	926	479	280
AC-FT	7630	7140	4490	5570	7720	24670	17260	85710	224600	97030	51750	23320
CFSM	.04	.03	.02	.03	.04	.11	.08	.40	1.07	.45	.24	.11
IN.	.04	.04	.02	.03	.04	.13	.09	.46	1.20	.52	.28	.12

CAL YR 1989 TOTAL 137409 MEAN 376 MAX 4500 MIN 43 AC-FT 272600 CFSM .11 IN. 1.45
WTR YR 1990 TOTAL 280860 MEAN 769 MAX 17800 MIN 43 AC-FT 557100 CFSM .22 IN. 2.96

SOLDIER RIVER BASIN

201

06608500 SOLDIER RIVER AT PISGAH, IA

LOCATION.--Lat 41°49'50", long 95°55'54", in NW1/4 NE1/4 sec.14, T.81 N., R.44 W., Harrison County, Hydrologic Unit 10230001, on right bank at upstream side of bridge on county highway F20, at west edge of Pisgah, 0.4 mi downstream from Cobb Creek, 0.5 mi upstream from Mogger Ditch, and 13.1 mi upstream from mouth.

DRAINAGE AREA.--407 mi².

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 956: 1940 (M). WSP 1240: 1940, 1941 (M), 1947. WSP 1440: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,036.53 ft above NGVD. Prior to Oct. 11, 1954, nonrecording gage at same site and datum with supplementary water-stage recorder operating above 8.2 ft gage height Mar. 2, 1946 to Sept. 24, 1953. Prior to Feb. 1954, on left bank at downstream side of bridge. Prior to June 21, 1989, at site 100 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 18 to Feb. 26, May 20, 26-29, and July 18-24. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--50 years, 134 ft³/s, 4.47 in/yr, 97,080 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,500 ft³/s June 12, 1950, gage height, 28.17 ft; minimum daily discharge, 2.0 ft³/s Jan. 2-10, 1945.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)		Gage height (ft)		Date	Time	Discharge (ft ³ /s)		Gage height (ft)	
		May 19	0900	6,840	13.97			June 15	0500	9,600	17.03
June 13	1230	5,230		12.04		June 17	0600	*17,200		*24.42	

Minimum daily discharge, 11 ft³/s Dec. 22.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	29	35	14	18	34	52	37	123	156	111	81
2	24	28	30	17	20	38	45	35	133	152	128	89
3	23	29	25	19	23	37	42	36	163	148	249	102
4	24	33	30	18	27	35	43	43	119	129	132	86
5	123	34	35	17	33	36	40	42	110	187	104	75
6	64	30	25	16	38	35	37	36	107	141	93	70
7	40	31	20	20	45	43	38	35	99	135	89	64
8	37	32	24	23	39	92	41	32	143	129	88	63
9	36	33	29	25	38	302	43	58	154	345	89	61
10	33	34	25	28	40	138	50	89	108	337	86	59
11	31	31	21	30	43	107	49	61	100	371	89	58
12	30	30	18	26	45	93	43	63	97	162	93	56
13	29	31	20	22	35	144	47	63	2380	146	86	55
14	29	30	17	25	18	323	50	52	494	131	82	53
15	30	29	13	30	22	113	50	48	4100	125	81	50
16	31	21	14	36	17	91	48	68	1800	118	81	49
17	29	27	16	45	18	85	51	65	7880	111	83	49
18	27	30	19	52	22	79	47	85	874	102	80	63
19	30	35	17	44	28	67	45	2480	765	112	73	83
20	33	30	15	35	30	61	46	560	629	255	78	70
21	31	28	13	30	39	60	44	187	365	135	324	66
22	31	26	11	27	43	60	43	143	606	120	123	61
23	30	24	12	38	36	55	44	1350	405	110	99	56
24	30	35	13	50	30	48	44	1450	291	100	683	56
25	32	30	14	40	34	47	42	1620	250	1320	486	57
26	31	25	16	30	45	47	42	400	229	576	222	54
27	29	30	17	44	69	45	40	220	211	271	128	52
28	29	25	18	38	33	44	38	190	194	230	109	51
29	30	18	17	33	---	48	38	160	183	238	103	49
30	30	28	16	24	---	50	37	141	171	168	95	51
31	30	---	15	20	---	51	---	126	---	122	88	---
TOTAL	1063	876	610	916	928	2508	1319	9975	23283	6882	4455	1889
MEAN	34.3	29.2	19.7	29.5	33.1	80.9	44.0	322	776	222	144	63.0
MAX	123	35	35	52	69	323	52	2480	7880	1320	683	102
MIN	23	18	11	14	17	34	37	32	97	100	73	49
AC-FT	2110	1740	1210	1820	1840	4970	2620	19790	46180	13650	8840	3750
CFSM	.08	.07	.05	.07	.08	.20	.11	.79	1.91	.55	.35	.15
IN.	.10	.08	.06	.08	.08	.23	.12	.91	2.13	.63	.41	.17

CAL YR 1989	TOTAL 24039	MEAN 65.9	MAX 1660	MIN 11	AC-FT 47680	CFSM .16	IN. 2.20
WTR YR 1990	TOTAL 54704	MEAN 150	MAX 7880	MIN 11	AC-FT 108500	CFSM .37	IN. 5.00

BOYER RIVER BASIN

06609500 BOYER RIVER AT LOGAN, IA

LOCATION.--Lat. 41°38'33", long 95°46'57", in SE1/4 NW1/4 sec.19, T.79 N., R.42 W., Harrison County, Hydrologic Unit 10230007, on left bank 9 ft downstream from Chicago Central and Pacific Railroad bridge at Logan, 0.4 mi downstream from Elk Grove Creek, 10.5 mi upstream from Willow Creek, and 15.8 mi upstream from mouth.

DRAINAGE AREA.--871 mi².

PERIOD OF RECORD.--May 1918 to July 1925, November 1937 to current year. Monthly discharge only for some periods, published in WSP 1310.

REVISED RECORDS.--WSP 956: 1938-39. WSP 1240: 1918-19, 1920 (M), 1921, 1922 (M), 1924-25, 1938 (M), 1945. WSP 1440: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,009.38 ft above NGVD (Chicago and Northwestern Railway Company bench mark). See WSP 1918 for history of changes prior to Oct. 18, 1960.

REMARKS.--Estimated daily discharges: Nov. 17 to Mar. 2. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--58 years (water years 1919-24, 1939-90), 333 ft³/s, 5.19 in/yr, 241,300 acre-ft/yr; median of yearly mean discharges, 280 ft³/s, 4.4 in/yr, 203,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,800 ft³/s June 17, 1990, gage height, 22.54 ft; maximum gage height, 25.22 ft Mar. 1, 1965, backwater from ice; minimum daily discharge, 1.5 ft³/s July 16, 1938.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 19	unknown	20,500	18.97	June 17	1000	*30,800	*22.54
June 13	1400	19,100	18.40	July 25	1600	8,530	13.12
June 15	0800	18,300	18.05				

Minimum daily discharge, 18 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	53	60	45	24	80	60	185	119	530	830	558	342
2	51	58	48	29	60	80	172	117	553	720	516	325
3	52	57	35	32	58	86	160	118	1820	710	523	347
4	52	56	40	31	80	84	157	134	909	665	494	318
5	141	59	54	28	96	84	152	134	716	997	441	280
6	232	56	50	25	94	84	142	119	612	716	400	264
7	99	57	35	26	80	93	132	111	569	648	372	246
8	77	59	28	29	92	195	135	112	588	611	356	239
9	75	59	35	31	96	575	136	148	578	675	339	228
10	67	57	43	35	88	436	155	250	488	935	329	232
11	59	54	34	39	84	302	168	207	424	1080	431	218
12	56	56	29	35	82	227	151	199	405	671	423	206
13	54	60	40	33	76	514	155	214	8510	622	317	198
14	53	58	30	43	52	1910	167	192	2770	583	291	194
15	53	58	25	50	60	710	160	183	8220	544	277	189
16	62	39	22	60	80	474	153	185	3900	513	281	182
17	62	42	25	75	100	390	156	184	19300	480	302	181
18	54	36	28	84	90	356	150	164	6330	457	308	208
19	51	45	25	70	80	339	147	9250	3370	442	279	246
20	54	60	23	60	70	296	146	2650	2270	558	256	235
21	57	52	20	50	65	282	146	1470	1330	546	568	217
22	58	45	18	45	80	264	139	955	1790	497	337	201
23	55	40	19	56	95	247	132	1410	2880	442	323	183
24	55	35	20	75	80	226	128	2300	1290	423	659	178
25	55	45	22	65	70	213	128	4710	984	2880	2540	181
26	55	50	24	55	80	205	121	1880	909	2210	1320	178
27	54	45	28	75	85	194	123	1280	872	1190	844	170
28	52	35	30	100	70	198	123	935	830	1170	596	163
29	55	25	28	90	---	198	124	763	1390	1070	494	160
30	55	35	27	80	---	205	123	648	1080	820	428	157
31	56	---	25	75	---	192	---	571	---	644	380	---
TOTAL	2064	1493	955	1605	2223	9719	4366	31712	76217	25349	15982	6666
MEAN	66.6	49.8	30.8	51.8	79.4	314	146	1023	2541	818	516	222
MAX	232	60	54	100	100	1910	185	9250	19300	2880	2540	347
MIN	51	25	18	24	52	60	121	111	405	423	256	157
AC-FT	4090	2960	1890	3180	4410	19280	8660	62900	151200	50280	31700	13220
CFSM	.08	.06	.04	.06	.09	.36	.17	1.17	2.92	.94	.59	.26
IN.	.09	.06	.04	.07	.09	.42	.19	1.35	3.26	1.08	.68	.28

CAL YR 1989 TOTAL 59740 MEAN 164 MAX 5600 MIN 18 AC-FT 118500 CFSM .19 IN. 2.55
WTR YR 1990 TOTAL 178351 MEAN 489 MAX 19300 MIN 18 AC-FT 353800 CFSM .56 IN. 7.62

MISSOURI RIVER MAIN STEM

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06610000 MISSOURI RIVER AT OMAHA, NE

LOCATION.--Lat 41°15'32", long 95°55'20", in SE1/4 NW1/4 sec.23, T.15 N., R.13 E., Douglas County, Hydrologic Unit 10230006, on right bank on left side of concrete floodwall, at foot of Douglas Street, 275 ft downstream from Interstate 480 Highway bridge in Omaha, and at mile 615.9.

DRAINAGE AREA.--322,800 mi², approximately. The 3,959 mi² in Great Divide basin are not included.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1928 to current year. April 1872 to December 1899 (gage heights only) in reports of the Missouri River Commission and since January 1875, (gage heights only) in reports of the U.S. Weather Bureau.

REVISED RECORDS.--WSP 761: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 948.24 ft above NGVD. See WSP 1730 for history of changes prior to Sept. 30, 1936. Oct. 1, 1936 to Sept. 30, 1982 at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 12-20. Records good except those for estimated daily discharges, which are poor. Flow regulated by upstream main-stem reservoirs. U.S. Army Corps of Engineers rain-gage and satellite data collection platform and U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--62 years, 30,750 ft³/s, 22,280,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 396,000 ft³/s Apr. 18, 1952, gage height, 40.20 ft, present datum; minimum, about 2,200 ft³/s Jan. 6, 1937; minimum gage height, 6.85 ft, present datum, Feb. 5, 1989, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 84,400 ft³/s June 17, gage height, 26.89 ft; minimum daily discharge, 8,000 ft³/s Dec. 18; minimum gage height, 8.23 ft Dec. 17, result of freeze-up.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	31600	19700	13100	15300	15000	15500	25600	28300	29200	41800	30400	29300
2	31500	17800	14000	14800	14600	13900	25700	28300	32200	35100	29800	29500
3	31500	16600	13000	14500	14900	13000	25800	28400	29400	34000	30300	30100
4	31500	16100	12900	14900	13700	12500	25600	28300	30300	35600	30500	31000
5	31800	15900	12900	15300	14600	12300	26000	28100	32000	31200	30400	31300
6	32100	15600	13900	15200	15900	12300	26400	27900	28100	31700	30000	31400
7	32200	14400	13600	15000	15700	12500	26800	27600	28900	33600	29400	31700
8	31900	13900	12800	14900	14800	12600	26700	27300	31500	30200	29400	32100
9	32300	13600	13400	15000	13900	13200	26600	27500	28400	31000	29500	32500
10	32400	13300	13800	15200	14000	13600	26700	27700	28800	34000	30200	32700
11	32100	13300	14100	15300	13200	13600	26900	28400	31200	32400	30800	33100
12	32100	13000	13500	15000	13100	13500	26800	26500	27700	32300	31200	33400
13	32300	12900	12500	14400	13100	14000	26800	24600	34700	33200	30900	33500
14	32300	12800	11000	13600	13400	16000	26800	25700	43500	31900	30800	33500
15	32300	12800	9500	13400	14800	14900	27400	29500	44600	32000	30800	33500
16	32200	12900	9000	14700	15500	14400	28000	27000	43500	32700	30300	33500
17	31400	12700	8500	15700	15800	13500	28200	27500	71700	31500	30100	33600
18	31100	12600	8000	15400	16700	13100	28300	30400	69300	31600	30100	33600
19	31200	13000	10000	14900	16000	12700	28000	35700	53100	32700	30100	33800
20	31200	12300	13000	14600	16400	12300	27400	50600	45400	31900	29800	34300
21	31200	12100	15100	14200	16600	12200	27100	46000	41700	36700	29900	33900
22	31200	12200	14700	13600	15800	12400	27100	30900	43800	33000	30200	33500
23	31300	12200	13300	13700	14300	12400	27100	29300	41700	32000	29900	32900
24	31600	12300	12600	13900	13500	12400	27600	45200	39200	31300	30200	32700
25	31800	12300	13000	14100	13400	12300	27700	51200	39000	33600	34100	32900
26	31800	12500	16000	13700	14200	12400	28100	42600	33600	42200	33600	32700
27	31100	12500	17800	13400	15800	13500	28000	38100	34200	35100	31700	32500
28	28900	12300	18000	13400	16200	15800	27900	32000	36900	33500	30100	32300
29	26600	12200	17800	13700	---	18500	28100	31600	33000	31200	29600	32300
30	23900	12000	17300	14400	---	21600	28200	33300	38800	34500	29400	32500
31	21900	---	16200	14700	---	24700	---	28800	---	32000	29300	---
TOTAL	958300	407800	414300	449900	414900	437600	813400	994300	1145400	1035500	942800	975600
MEAN	30910	13590	13360	14510	14820	14120	27110	32070	38180	33400	30410	32520
MAX	32400	19700	18000	15700	16700	24700	28300	51200	71700	42200	34100	34300
MIN	21900	12000	8000	13400	13100	12200	25600	24600	27700	30200	29300	29300
AC-FT	1901000	808900	821800	892400	823000	868000	1613000	1972000	2272000	2054000	1870000	1935000

CAL YR 1989 TOTAL 9400250 MEAN 25750 MAX 44500 MIN 6500 AC-FT 18650000
WTR YR 1990 TOTAL 8989800 MEAN 24630 MAX 71700 MIN 8000 AC-FT 17830000

MISSOURI RIVER MAIN STEM

06610000 MISSOURI RIVER AT OMAHA, NE--Continued

WATER-QUALITY RECORDS

LOCATION.--Water quality samples were collected from Interstate 80 highway bridge 2.0 mi downstream from gaging station. Samples for particle-size distribution were collected from boat cross-section 3.6 mi downstream from gaging station.

PERIOD OF RECORD.--Water years 1969-76, 1978 to current year. Daily sediment loads for April 1939 to September 1971 are in reports of U.S. Army Corps of Engineers.

PERIOD OF DAILY RECORD.--

CHEMICAL ANALYSES: July 1969 to June 1972.

SPECIFIC CONDUCTANCE: October 1972 to September 1976, January 1978 to September 1981.

WATER TEMPERATURES: October 1971 to September 1976, January 1978 to September 1981.
SUSPENDED SEDIMENT DISCHARGE: October 1971 to September 1976

SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1976.

**EXTREMES FOR PERIOD OF DAILY RECORD. --
SPECIFIC CONDUCTANCE: Maximum daily**

SPECIFIC CONDUCTANCE: Maximum daily, 950 microsiemens Dec. 4, 1980; minimum daily, 335 microsiemens Mar. 22, 1976. WATER TEMPERATURES: Maximum daily, 32.0°C July 24, 1972; minimum daily, 0.0°C on many days during winter period.

WATER TEMPERATURES: Maximum daily, 32.0°C July 24, 1972; minimum daily, 0.0°C on many days during winter period.

SEDIMENT LOADS: Maximum daily, 1,060,000 tons May 19, 1974; minimum daily, 3,990 tons Jan. 14, 1975.

SEDIMENT LOADS: Maximum daily, 1,060,000 tons May 19, 1974; minimum daily, 3,990 tons Jan. 14, 1975.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

		DIS-	CHARGE,	SPE-		DIS-	CHARGE,	SPE-
		INST.	CUBIC	CIFIC		INST.	CUBIC	CIFIC
		FEET	TEMPER-	CON-		FEET	TEMPER-	CON-
DATE	TIME	PER	WATER	DUCT-		PER	WATER	DUCT-
		SECOND	(DEG C)	(US/CM)		SECOND	(DEG C)	(US/CM)
		(00061)	(00010)	(00095)		(00061)	(00010)	(00095)
OCT 1989					APR 1990			
02...	1125	31800	17.5	785	02...	1050	25600	8.0
10...	1135	32300	14.0	850	05...	1040	25200	6.0
30...	1100	23700	14.0	750	12...	1140	25800	8.0
NOV					16...	1115	28000	9.0
02...	1105	18100	10.0	800	MAY			
06...	1530	15700	9.0	830	01...	1050	28300	14.0
10...	1030	13300	4.0	900	07...	1050	27600	16.0
15...	1040	12800	7.0	800	14...	1030	25000	15.0
16...	1200	12900	5.0	750	JUN			
20...	1100	12300	2.0	900	06...	1015	27800	16.0
22...	1050	12200	3.0	850	11...	1100	31900	21.0
27...	1100	12500	2.0	800	18...	1240	69500	23.0
30...	1200	11600	2.0	800	JUL			
DEC					02...	1250	35000	28.0
05...	0950	12800	2.0	800	09...	1025	30300	29.0
JAN 1990					16...	1100	32800	30.0
08...	1220	14900	1.0	900	30...	1045	35100	25.0
17...	1115	15700	1.0	900	AUG			
22...	1510	13400	2.0	800	06...	1030	30100	25.0
29...	1420	13600	2.0	960	13...	1025	30800	25.0
FEB					21...	1100	29700	25.0
05...	1430	15300	3.0	825	28...	1130	30000	27.0
12...	1530	13100	6.0	850	SEP			
21...	1530	16400	2.0	800	04...	1330	29300	26.0
28...	1510	16300	3.0	750	12...	1035	33300	25.0
MAR					17...	1105	31800	20.0
05...	1415	12300	7.0	805	24...	1055	33400	17.0
12...	1645	13600	11.0	800				
19...	1200	12700	6.0	845				

MISSOURI RIVER MAIN STEM

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06610000 MISSOURI RIVER AT OMAHA, NE--Continued

WATER-QUALITY RECORDS

DATE	TIME	SAMPLE LOC- AT ATION, CROSS SECTION	DEPTH TOTAL (FT FM)	STREAM SAM- PLING (FEET)	SEDI- MENT, ITY (FPS)	SUS- PENDED (MG/L)	SED. SUSP. % FINER .004 MM	SED. SUSP. % FINER .062 MM	SED. SUSP. % FINER .125 MM	SED. SUSP. % FINER .250 MM	SED. SUSP. % FINER .500 MM
		L BANK)	(FEET)	(81903)	(81904)	(80154)	(70338)	(70342)	(70343)	(70344)	(70345)
OCT											
18...	1015	WATER 140	9.5° C (1015-1255); 9.80	DISCHARGE, 2.30	3.26	160	--	60	70	96	100
18...	1019	140	--	4.90	3.15	150	--	60	72	96	100
18...	1023	140	--	7.00	2.68	246	--	36	46	92	100
18...	1027	140	--	8.20	2.55	210	--	37	46	87	100
18...	1031	140	--	8.80	2.16	260	--	25	38	87	100
18...	1035	140	--	--	--	185	--	54	64	95	100
18...	1045	290	10.2	2.40	4.33	176	--	38	53	96	100
18...	1049	290	--	5.10	3.74	297	--	35	50	94	100
18...	1054	290	--	7.30	3.50	432	--	18	30	93	100
18...	1057	290	--	8.50	3.39	527	--	22	31	91	100
18...	1101	290	--	9.20	3.26	468	--	14	27	88	100
18...	1105	290	--	--	--	293	--	32	46	93	100
18...	1110	415	--	--	--	747	3	6	--	--	--
18...	1115	415	15.0	3.50	4.37	--	--	--	--	--	--
18...	1119	415	--	7.50	4.28	--	--	--	--	--	--
18...	1123	415	--	10.7	4.22	--	--	--	--	--	--
18...	1127	415	--	12.5	4.07	--	--	--	--	--	--
18...	1131	415	--	13.5	4.26	--	--	--	--	--	--
18...	1135	415	--	14.1	4.28	--	--	--	--	--	--
18...	1140	415	--	--	--	421	--	21	35	84	100
18...	1150	520	17.8	4.10	4.85	180	--	54	70	97	100
18...	1154	520	--	8.90	4.37	205	--	39	58	99	100
18...	1158	520	--	12.7	4.09	208	--	33	56	100	--
18...	1202	520	--	14.8	3.74	443	--	19	31	95	100
18...	1206	520	--	16.0	3.39	380	--	22	40	99	100
18...	1210	520	--	16.8	3.20	452	--	18	37	97	100
18...	1215	520	--	--	--	181	--	33	51	100	--
18...	1230	600	19.4	4.50	4.59	96	--	66	86	99	100
18...	1234	600	--	9.70	4.11	146	--	60	78	100	--
18...	1238	600	--	13.9	3.72	142	--	55	71	99	100
18...	1242	600	--	16.2	3.65	153	--	54	74	100	--
18...	1246	600	--	17.5	3.22	152	--	48	65	100	--
18...	1250	600	--	18.3	2.74	156	--	51	69	100	--
18...	1255	600	--	--	--	117	--	60	78	100	--
DATE											
		SAMPLE LOC- AT ATION, CROSS SECTION	DEPTH TOTAL (FT FM)	STREAM SAM- PLING (FEET)	SEDI- MENT, ITY (FPS)	SUS- PENDED (MG/L)	SED. SUSP. % FINER .004 MM	SED. SUSP. % FINER .062 MM	SED. SUSP. % FINER .125 MM	SED. SUSP. % FINER .250 MM	SED. SUSP. % FINER .500 MM
		L BANK)	(FEET)	(81903)	(81904)	(80154)	(70338)	(70342)	(70343)	(70344)	(70345)
APR											
25...	1000	WATER 150	14.0° C (1000-1250); 7.80	DISCHARGE, 3.22	145	--	68	80	98	100	--
25...	1005	150	--	3.90	3.24	186	--	56	67	97	100
25...	1010	150	--	5.60	2.85	246	--	53	61	95	100
25...	1015	150	--	6.50	2.72	195	--	53	61	95	100
25...	1020	150	--	7.00	2.13	228	--	48	57	95	100
25...	1025	150	--	--	--	196	--	61	71	98	100
25...	1040	295	10.6	2.50	3.85	176	--	70	85	100	--
25...	1044	295	--	5.30	3.65	175	--	61	73	99	100
25...	1048	295	--	7.60	2.63	423	--	29	38	89	100
25...	1052	295	--	8.80	2.63	422	--	22	29	87	100
25...	1056	295	--	9.50	2.47	675	--	17	22	60	100
25...	1100	295	--	--	--	287	--	48	57	88	100
25...	1105	425	13.6	3.10	4.15	--	252	14	35	--	--
25...	1110	425	--	6.80	3.85	111	--	--	--	--	--
25...	1113	425	--	9.70	3.83	--	--	--	--	--	--
25...	1116	425	--	11.3	3.74	--	--	--	--	--	--
25...	1119	425	--	12.2	3.70	--	--	--	--	--	--
25...	1122	425	--	12.8	3.52	--	--	--	--	--	--
25...	1130	425	--	--	--	239	--	53	69	99	100
25...	1145	510	15.6	3.60	4.41	188	--	72	88	100	--
25...	1149	510	--	7.80	4.15	214	--	61	77	100	--
25...	1153	510	--	11.1	3.94	232	--	58	77	100	--
25...	1157	510	--	13.0	3.24	267	--	49	66	99	100
25...	1201	510	--	14.0	2.89	310	--	47	64	98	100
25...	1205	510	--	14.7	2.63	327	--	40	55	98	100
25...	1210	510	--	--	--	207	--	65	81	100	--
25...	1230	605	17.2	4.00	4.48	172	--	78	90	100	--
25...	1233	605	--	8.6	4.48	175	--	79	92	100	--
25...	1236	605	--	12.3	4.00	179	--	84	93	100	--
25...	1239	605	--	14.3	3.72	195	--	83	93	99	100
25...	1242	605	--	15.5	3.35	153	--	76	91	99	100
25...	1245	605	--	16.2	3.42	188	--	77	90	100	--
25...	1250	605	--	--	--	154	--	86	97	100	--

MISSOURI RIVER MAIN STEM

06610000 MISSOURI RIVER AT OMAHA, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAMPLE	DEPTH	STREAM	SEDI-	SED.	SED.	SED.	SED.	SED.
		LOC-	AT			SUSP.	SUSP.	FALL	FALL	FALL
CROSS,	LOC-	SAM-	VELOC-	MENT,	DIAM.	DIAM.	DIAM.	DIAM.	DIAM.	SUSP.
SECTION	ATION,	PLING	ITY,	SUS-	% FINER	% FINER	% FINER	% FINER	% FINER	% FINER
(FT FM	TOTAL	DEPTH	POINT	PENDED	THAN	THAN	THAN	THAN	THAN	THAN
L BANK)	(FEET)	(FEET)	(FPS)	(MG/L)	.004 MM	.062 MM	.125 MM	.250 MM	.500 MM	(70345)
(00009)	(81903)	(00003)	(81904)	(80154)	(70338)	(70342)	(70343)	(70344)	(70345)	
JUN										
06...	WATER	TEMPERATURE,	16.0° C	(1010-1255):	DISCHARGE,	27,800 ft³/s.				
06...	1010	160	10.6	2.50	3.18	363	--	88	95	100
06...	1014	160	--	5.30	2.81	318	--	86	94	100
06...	1018	160	--	7.60	2.61	382	--	85	90	99
06...	1022	160	--	8.80	2.50	427	--	74	81	99
06...	1026	160	--	9.50	2.31	479	--	69	77	100
06...	1030	160	--	--	--	373	--	87	93	100
06...	1045	320	10.8	2.50	4.26	363	--	86	92	100
06...	1048	320	--	5.40	3.76	431	--	72	81	100
06...	1051	320	--	7.70	3.46	441	--	72	80	100
06...	1054	320	--	9.00	3.24	464	--	61	70	96
06...	1057	320	--	9.70	3.28	637	--	48	56	90
06...	1100	320	--	--	--	486	--	63	71	97
06...	1112	445	--	--	--	414	26	61	--	--
06...	1115	445	15.4	3.60	4.26	--	--	--	--	--
06...	1119	445	--	7.70	3.72	--	--	--	--	--
06...	1123	445	--	11.0	3.61	--	--	--	--	--
06...	1127	445	--	12.8	3.52	--	--	--	--	--
06...	1131	445	--	13.9	3.20	--	--	--	--	--
06...	1135	445	--	14.5	3.18	--	--	--	--	--
06...	1140	445	--	--	--	415	--	72	83	100
06...	1155	545	16.8	3.90	4.76	377	--	87	96	100
06...	1158	545	--	8.40	4.37	430	--	77	87	100
06...	1201	545	--	12.0	3.65	398	--	69	80	99
06...	1204	545	--	14.0	3.15	505	--	58	69	99
06...	1207	545	--	15.1	3.22	522	--	57	70	99
06...	1210	545	--	15.8	2.70	491	--	53	65	98
06...	1215	545	--	--	4.76	375	--	75	85	100
06...	1230	625	17.4	4.00	4.04	289	--	92	98	100
06...	1234	625	--	8.70	3.55	303	--	93	98	100
06...	1238	625	--	12.4	3.39	317	--	92	98	100
06...	1242	625	--	14.5	3.02	310	--	93	98	100
06...	1246	625	--	15.7	2.85	312	--	93	98	100
06...	1250	625	--	16.4	2.61	287	--	93	99	100
06...	1255	625	--	--	2.61	288	--	94	98	100
DATE	TIME	SAMPLE	DEPTH	STREAM	SEDI-	SED.	SED.	SED.	SED.	SED.
CROSS,	LOC-	AT	SAMPLE	LOC-	MENT,	SUSP.	SUSP.	FALL	FALL	FALL
SECTION	ATION,	PLING	ITy,	DEPTH	SUS-	% FINER	% FINER	% FINER	% FINER	% FINER
(FT FM	TOTAL	DEPTH	POINT	POINT	PENDED	THAN	THAN	THAN	THAN	THAN
L BANK)	(FEET)	(FEET)	(FPS)	(MG/L)	.004 MM	.062 MM	.125 MM	.250 MM	.500 MM	(70345)
(00009)	(81903)	(00003)	(81904)	(80154)	(70338)	(70342)	(70343)	(70344)	(70345)	
JUL										
25...	WATER	TEMPERATURE,	23.0° C	(1010-1245):	DISCHARGE,	31,400 ft³/s.				
25...	1010	170	11.0	2.50	3.85	197	--	88	96	100
25...	1014	170	--	5.50	3.46	216	--	85	95	100
25...	1018	170	--	7.90	2.81	238	--	77	86	98
25...	1022	170	--	92.0	2.63	275	--	60	73	98
25...	1026	170	--	9.90	2.63	326	--	58	68	89
25...	1030	170	--	--	--	248	--	82	89	98
25...	1040	325	11.6	2.60	4.28	270	--	69	82	99
25...	1043	325	--	5.80	3.81	361	--	58	72	98
25...	1046	325	--	8.30	3.61	390	--	50	65	97
25...	1049	325	--	9.70	3.65	505	--	41	57	97
25...	1052	325	--	10.4	3.50	484	--	42	56	94
25...	1055	325	--	--	--	380	--	56	70	97
25...	1105	440	17.4	4.00	4.48	74	--	0	--	--
25...	1108	440	--	8.70	4.04	--	--	--	--	--
25...	1111	440	--	12.4	3.72	--	--	--	--	--
25...	1114	440	--	14.5	3.07	--	--	--	--	--
25...	1117	440	--	15.7	2.85	--	--	--	--	--
25...	1120	440	--	16.4	2.66	--	--	--	--	--
25...	1125	440	--	--	--	357	--	57	75	99
25...	1130	440	--	--	--	417	14	35	--	--
25...	1140	525	17.8	4.10	4.59	230	--	82	94	100
25...	1144	525	--	8.90	4.26	304	--	71	85	100
25...	1148	525	--	12.7	3.83	379	--	52	70	99
25...	1152	525	--	14.8	3.68	561	--	36	55	94
25...	1156	525	--	16.0	3.61	427	--	45	62	97
25...	1200	525	--	16.8	3.28	705	--	33	51	94
25...	1205	525	--	--	--	332	--	66	80	99
25...	1225	600	17.8	4.10	4.83	204	--	92	98	100
25...	1228	600	--	8.90	4.70	187	--	88	97	100
25...	1231	600	--	12.7	4.04	198	--	91	98	100
25...	1234	600	--	14.8	4.00	187	--	86	96	100
25...	1237	600	--	16.0	3.72	174	--	81	96	100
25...	1240	600	--	16.8	3.72	236	--	86	95	100
25...	1245	600	--	--	--	205	--	87	96	100

MISSOURI RIVER MAIN STEM

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06610000 MISSOURI RIVER AT OMAHA, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC- ATION, PLING (FEET) (81903)	STREAM SAM- VELOC- ITY (FEET) (81904)	SEDI- MENT, SUS- PENDED (FPS) (80154)	SED. SUSP. % FINER THAN .004 MM (70338)	SED. SUSP. % FINER THAN .062 MM (70342)	SED. SUSP. % FINER THAN .125 MM (70343)	SED. SUSP. % FINER THAN .250 MM (70344)	SED. SUSP. % FINER THAN .500 MM (70345)
AUG										
29...		WATER TEMPERATURE, 27.0° C (0915-1240); DISCHARGE, 29,600 ft³/s.								
29...		1000 160 9.00	2.10 3.61	172 --	--	89	94	100	--	
29...		1003 160 --	4.50 3.28	231 --	--	65	75	100	--	
29...		1009 160 --	6.40 2.81	207 --	--	76	83	100	--	
29...		1012 160 --	7.50 2.76	215 --	--	69	77	100	--	
29...		1016 160 --	8.10 2.79	216 --	--	70	79	100	--	
29...		1020 160 --	-- --	182 --	--	89	95	100	--	
29...		1040 310 11.0	2.50 3.50	170 --	--	83	91	100	--	
29...		1043 310 --	5.50 2.96	273 --	--	62	73	99	100	
29...		1046 310 --	7.90 2.87	366 --	--	45	58	97	100	
29...		1049 310 --	9.20 2.53	520 --	--	33	44	89	100	
29...		1052 310 --	9.90 2.40	586 --	--	26	38	89	100	
29...		1055 310 --	-- --	292 --	--	53	67	99	100	
29...		1115 430 15.4	3.60 4.07	-- --	--	--	--	--	--	
29...		1118 430 --	7.70 4.07	-- --	--	--	--	--	--	
29...		1121 430 --	11.0 3.72	-- --	--	--	--	--	--	
29...		1124 430 --	12.8 3.46	-- --	--	--	--	--	--	
29...		1129 430 --	13.9 3.50	-- --	--	--	--	--	--	
29...		1132 430 --	14.5 3.39	-- --	--	--	--	--	--	
29...		1140 430 --	-- --	230 --	--	59	74	100	--	
29...		1150 530 17.0	3.90 4.61	158 --	--	84	95	100	--	
29...		1153 530 --	8.50 4.26	230 --	--	64	81	100	--	
29...		1156 530 --	12.1 3.83	239 --	--	57	74	100	--	
29...		1159 530 --	14.2 3.63	346 --	--	45	60	97	100	
29...		1200 430 --	-- --	259 12	34	--	--	--	--	
29...		1204 530 --	15.3 3.28	491 --	--	28	43	89	100	
29...		1208 530 --	16.0 2.70	672 --	--	19	28	78	100	
29...		1215 530 --	-- --	243 --	--	59	73	98	100	
29...		1235 615 17.2	4.00 4.70	147 --	--	89	98	100	--	
29...		1238 615 --	8.60 4.28	174 --	--	86	96	100	--	
29...		1241 615 --	12.3 3.78	137 --	--	81	96	100	--	
29...		1245 615 --	14.3 3.39	151 --	--	86	97	100	--	
29...		1250 615 --	15.5 3.39	167 --	--	83	95	100	--	
29...		1255 615 --	16.2 3.50	208 --	--	80	90	100	--	
29...		1300 615 --	-- --	161 --	--	90	97	100	--	

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED-MATERIAL, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET SECOND (00061)	NUMBER OF SAM- PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. .062 MM (80164)	BED MAT. SIEVE DIAM. .125 MM (80165)	BED MAT. SIEVE DIAM. .250 MM (80166)	BED MAT. SIEVE DIAM. .500 MM (80167)	BED MAT. SIEVE DIAM. 1.00 MM (80168)	BED MAT. SIEVE DIAM. 2.00 MM (80169)	BED MAT. SIEVE DIAM. 4.00 MM (80170)	BED MAT. SIEVE DIAM. 8.00 MM (80171)	
OCT 18...	1300	31000	5	0	3	32	88	95	98	99	100	
APR 25...	1255	26900	4	0	1	32	98	100	--	--	--	
JUN 06...	1310	27800	4	0	1	27	98	100	--	--	--	
JUL 25...	1300	31400	5	0	1	14	85	96	99	100	--	
AUG 29...	1320	29600	5	0	2	18	91	97	99	100	--	

MISSOURI RIVER MAIN STEM

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE

LOCATION.--Lat 40°40'55", long 95°50'48", in NW1/4 NE1/4 sec.9, T.8 N., R.14 E., Otoe County, Hydrologic Unit 10240001, on right bank 2.0 mi upstream from Highway 2 Bridge at Nebraska City, and at mile 562.6.

DRAINAGE AREA .--410,000 mi², approximately. The 3,959 mi² in Great Divide basin are not included.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1929 to current year. Gage-height records collected in this vicinity from August 1878 to December 1899 are contained in reports of Missouri River Commission.

REVISED RECORDS.--WSP 761: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 905.36 ft above NGVD, supplementary adjustment of 1954. See WSP 1918 or 1919 for history of changes prior to Apr. 1, 1963.

REMARKS.--Estimated daily discharges: Dec. 2, 3, and Jan. 4, 5, 7, 8. Records good except those for estimated daily discharges, which are poor. Flow regulated by upstream main-stem reservoirs. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--61 years, 36,850 ft³/s, 26,700,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 414,000 ft³/s Apr. 19, 1952; maximum gage height, 27.66 ft Apr. 18, 1952; minimum discharge, 1,600 ft³/s Dec. 31, 1946 (discharge measurement); minimum gage height observed, -0.28 ft Dec. 24, 1960, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 115,000 ft³/s June 14, gage height, 20.56 ft; minimum daily discharge, 8,740 ft³/s Dec. 18, gage height, 1.49 ft, result of freeze-up.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	33300	24600	14100	18400	18400	19600	28500	31900	32900	40900	37600	30800
2	33000	22200	13500	17300	18100	18800	28800	31400	34800	39400	35000	30800
3	33000	20800	14500	17100	17300	17500	28100	31200	35600	35400	34100	31000
4	32800	19700	15300	16500	16600	17100	27300	31700	34300	36100	34000	31500
5	32700	19200	15000	17000	15500	16600	27000	31400	36000	35300	32800	32000
6	33000	19300	15900	17800	16500	16100	27300	31300	35600	32700	31400	32400
7	33400	19000	18300	17600	18200	16500	27500	31200	33200	34600	30900	32600
8	33300	18300	18200	17400	18600	17600	28400	31000	36500	34000	30700	32900
9	33300	17100	17100	17300	19100	18400	28700	31900	36400	31400	30900	33500
10	33400	16100	16600	17500	20200	20700	29100	32400	34000	33600	31100	33600
11	33400	16700	16100	18000	19800	21300	29000	31900	35100	35100	32200	33800
12	33200	16500	16400	17700	18900	20300	29100	32500	35200	34000	34100	34000
13	33300	16100	14500	17200	18700	19800	29100	31100	32100	34300	36000	34100
14	33500	15800	14000	16800	19200	22700	29100	30000	44400	34300	33900	34100
15	33400	15800	11400	16100	19700	22500	29100	31200	47800	32900	32400	34000
16	33900	16000	9810	16400	19200	21000	29500	32500	57800	33100	32000	33900
17	33700	16100	9280	19000	17600	21000	29500	31300	78600	32800	31500	33900
18	33300	15900	8740	20200	16500	19200	29800	34400	108000	31600	31500	33900
19	33100	14900	9030	19700	16400	17100	29900	34700	114000	31900	31600	34100
20	32900	16200	11400	19100	16300	17000	29800	42200	94100	33200	31600	34100
21	32800	16100	14300	18600	17300	16900	29600	44800	59500	33200	32000	34400
22	32800	15100	15100	17500	18700	15800	29700	38400	49000	35000	31900	33800
23	32800	15500	14600	16700	18900	15800	29700	32800	47700	33100	32400	33700
24	32900	15200	13500	16900	19900	15900	29800	38400	48800	33000	31700	33300
25	33000	14800	12900	17400	19500	15800	30100	49800	46100	34600	32900	33500
26	33400	14500	14000	17400	18900	15700	30800	48500	42200	83100	35300	33200
27	33400	14900	17200	17400	18900	16000	31000	44400	38600	65100	33000	33200
28	32300	15600	19600	17800	19400	18000	31200	40200	38500	47400	31900	32900
29	30600	15000	20300	17500	---	20700	31800	36200	38100	40300	31200	32700
30	28700	14400	20400	17900	---	23800	31700	36200	37000	38300	31400	32800
31	26500	---	19800	18700	---	26700	---	35600	---	39900	31100	---
TOTAL	1014100	507400	460860	547900	512300	581900	880000	1092500	1441900	1169600	1010100	994500
MEAN	32710	16910	14870	17670	18300	18770	29330	35240	48060	37730	32580	33150
MAX	33900	24600	20400	20200	20200	26700	31800	49800	114000	83100	37600	34400
MIN	26500	14400	8740	16100	15500	15700	27000	30000	32100	31400	30700	30800
AC-FT	2011000	1006000	914100	1087000	1016000	1154000	1745000	2167000	2860000	2320000	2004000	1973000
CAL YR 1989	TOTAL 10574330	MEAN 28970	MAX 81600	MIN 8010	AC-FT 20970000							
WTR YR 1990	TOTAL 10213060	MEAN 27980	MAX 114000	MIN 8740	AC-FT 20260000							

MISSOURI RIVER MAIN STEM

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06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

WATER-QUALITY RECORDS

LOCATION.--Samples for particle size distribution were collected from boat cross-section 0.7 mi upstream from gage.

PERIOD OF RECORD.--May 1951 to current year. Daily sediment loads August 1957 to September 1971 in reports of U.S. Army Corps of Engineers.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: May 1951 to September 1976.

WATER TEMPERATURES: May 1951 to September 1976.

SEDIMENT DISCHARGE: October 1971 to September 1976.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 994 microsiemens Dec. 17, 1962; minimum daily, 273 microsiemens June 17, 1964.

WATER TEMPERATURES: Maximum daily, 31°C July 26, 1977; minimum, 0.0°C on many days during winter periods.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 8,220 mg/L May 19, 1974; minimum daily mean, 137 mg/L Jan. 14, 1975.

SEDIMENT LOADS: Maximum daily, 1,590,000 tons May 19, 1974; minimum daily, 4,050 tons Jan. 17, 1972.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-	CHARGE,	SPE-	DATE	DIS-	CHARGE,	SPE-
		INST.	CUBIC	TEMPER-		INST.	CUBIC	CON-
		FEET	ATURE	DUCT-		FEET	ATURE	DUCT-
		PER	WATER	ANCE		PER	WATER	ANCE
		SECOND	(DEG C)	(US/CM)		SECOND	(DEG C)	(US/CM)
		(00061)	(00010)	(00095)		(00061)	(00010)	(00095)
OCT 1989					MAY 1990			
04...	1320	32000	14.0	790	08...	1030	31400	16.0
10...	1155	34500	14.0	805	15...	1200	34400	19.0
17...	1400	34500	14.0	750	15...	1300	29700	15.0
NOV					29...	1050	36400	20.0
01...	1230	24800	10.0	945	JUN			
06...	1000	19300	9.0	750	01...	0915	32900	19.0
10...	1500	16200	8.0	850	08...	1120	36800	20.0
14...	1600	15700	9.0	800	11...	0945	35100	22.0
15...	1200	15700	8.0	800	15...	1110	48200	23.0
20...	1500	16600	2.0	792	23...	1230	48600	25.0
24...	1130	15200	2.0	770	25...	1300	45500	25.0
DEC					28...	1045	37600	28.0
05...	1200	15000	1.0	840	JUL			
JAN 1990					06...	1025	32500	27.0
03...	1240	17100	0.0	850	10...	1040	33400	27.0
16...	1500	17500	3.0	820	13...	1035	34200	24.0
23...	1245	16700	3.0	850	16...	1130	33100	24.0
FEB					19...	1030	31800	26.0
07...	1500	18200	4.0	800	31...	1055	40200	26.5
23...	1150	18300	3.0	750	AUG			
MAR					03...	1115	34000	25.5
09...	0730	18300	4.0	800	06...	1230	31200	25.0
14...	1530	23300	13.0	650	10...	1040	30800	25.0
27...	1240	15900	8.0	750	16...	1250	31800	25.0
APR					21...	1330	32200	25.0
02...	1400	28900	10.0	700	24...	0945	31600	25.0
05...	1200	27100	11.0	700	28...	1140	31900	27.0
10...	1030	29300	10.0	760	31...	1240	30900	27.0
17...	1215	29600	10.0	750	SEP			
20...	1030	30000	11.0	780	04...	1200	31400	27.0
24...	0820	29800	17.0	800	07...	1140	31000	27.0
27...	1110	31100	19.0	750	12...	1445	32300	26.0
30...	0945	31800	14.0	775	17...	1320	32900	22.0
MAY					21...	0850	35200	20.0
04...	1315	31200	14.0	700	25...	1125	32100	18.0
					28...	1115	32300	19.0

MISSOURI RIVER MAIN STEM
06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued
WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAMPLE	DEPTH	STREAM	SEDI-	SED.	SED.	SED.	SED.	SED.	SED.		
		LOC-	AT									SUSP.	FALL
L	(FT FM	TOTAL	DEPTH	POINT	SUS-	% DIAM.	FALL	FALL	FALL	FALL	FALL	SUSP.	FALL
		(00009)	(81903)	(00003)	(81904)	(80154)	(004 MM)	(062 MM)	(125 MM)	(250 MM)	(500 MM)	(70345)	(70346)
OCT													
17..	WATER	TEMPERATURE, 14.0 °C (1020-1320);	DISCHARGE, 34,500 ft ² /s.										
17..	1020	145	15.8	3.70	4.80	122	--	69	82	100	--	--	--
17..	1024	145	--	7.90	4.46	126	--	66	78	97	100	--	--
17..	1028	145	--	11.3	4.07	150	--	55	69	94	100	--	--
17..	1032	145	--	13.2	3.50	214	--	43	53	95	100	--	--
17..	1036	145	--	14.2	3.00	212	--	46	57	92	100	--	--
17..	1040	145	--	14.9	2.85	219	--	40	54	90	100	--	--
17..	1045	145	--	--	--	151	--	57	70	96	100	--	--
17..	1100	245	16.8	3.90	5.56	248	--	39	57	99	100	--	--
17..	1103	245	--	8.40	4.93	322	--	25	44	99	100	--	--
17..	1106	245	--	12.0	4.52	512	--	19	38	98	100	--	--
17..	1109	245	--	14.0	3.98	827	--	12	27	96	100	--	--
17..	1112	245	--	15.1	2.59	1300	--	8	17	86	100	--	--
17..	1115	245	--	15.8	1.98	55	--	--	--	--	--	--	--
17..	1120	245	--	--	--	378	--	20	40	99	100	--	--
17..	1125	325	--	--	--	689	4	9	--	--	--	--	--
17..	1135	325	15.6	3.60	4.93	--	--	--	--	--	--	--	--
17..	1139	325	--	7.80	4.70	--	--	--	--	--	--	--	--
17..	1143	325	--	11.1	3.94	--	--	--	--	--	--	--	--
17..	1147	325	--	13.0	3.76	--	--	--	--	--	--	--	--
17..	1151	325	--	14.0	3.33	--	--	--	--	--	--	--	--
17..	1155	325	--	14.7	3.39	--	--	--	--	--	--	--	--
17..	1200	325	--	--	--	318	--	28	45	97	100	--	--
17..	1220	445	13.8	3.70	4.61	159	--	54	70	95	100	--	--
17..	1224	445	--	6.90	4.35	203	--	49	63	94	100	--	--
17..	1228	445	--	9.90	3.72	271	--	36	51	91	100	--	--
17..	1232	445	--	11.5	3.44	353	--	32	46	88	100	--	--
17..	1236	445	--	12.4	3.18	315	--	26	36	72	98	100	--
17..	1240	445	--	13.0	2.96	451	--	24	38	75	99	100	--
17..	1245	445	--	--	--	234	--	39	53	85	99	100	--
17..	1300	565	11.2	2.50	4.50	150	--	83	91	97	100	--	--
17..	1303	565	--	5.61	4.09	137	--	85	95	97	100	--	--
17..	1306	565	--	8.00	3.98	158	--	82	92	96	100	--	--
17..	1309	565	--	9.30	3.61	152	--	78	88	93	100	--	--
17..	1312	565	--	10.1	3.44	194	--	68	76	86	100	--	--
17..	1315	565	--	--	--	148	--	82	90	95	100	--	--
JUN													
05..	WATER	TEMPERATURE, 17.0 °C (1010-1310);	DISCHARGE, 37,100 ft ² /s.										
05..	1015	145	17.4	4.00	4.72	611	--	97	99	100	--	--	--
05..	1019	145	--	8.70	4.39	629	--	96	98	100	--	--	--
05..	1023	145	--	12.4	4.04	684	--	93	97	100	--	--	--
05..	1027	145	--	14.5	3.39	634	--	91	95	99	100	--	--
05..	1031	145	--	15.7	2.96	646	--	89	93	99	100	--	--
05..	1040	145	--	--	--	614	--	95	98	100	--	--	--
05..	1055	235	14.2	3.30	5.54	492	--	83	89	99	100	--	--
05..	1058	235	--	7.10	5.35	833	--	84	89	99	100	--	--
05..	1101	235	--	10.1	5.02	824	--	71	77	98	100	--	--
05..	1104	235	--	11.8	4.78	977	--	65	71	95	100	--	--
05..	1107	235	--	12.8	4.59	1180	--	53	59	93	100	--	--
05..	1110	235	--	13.4	4.41	1160	--	55	61	92	100	--	--
05..	1115	235	--	--	--	834	--	71	77	97	100	--	--
05..	1125	325	--	--	--	914	23	55	--	--	--	--	--
05..	1130	325	14.2	3.30	5.45	--	--	--	--	--	--	--	--
05..	1134	325	--	7.10	5.13	--	--	--	--	--	--	--	--
05..	1138	325	--	10.1	4.37	362	--	--	--	--	--	--	--
05..	1142	325	--	11.8	3.96	--	--	--	--	--	--	--	--
05..	1146	325	--	12.8	3.27	--	--	--	--	--	--	--	--
05..	1155	325	--	--	--	858	--	63	70	95	100	--	--
05..	1205	430	13.4	3.10	5.15	631	--	88	93	100	--	--	--
05..	1208	430	--	6.70	4.70	680	--	79	86	99	100	--	--
05..	1211	430	--	9.60	4.48	696	--	77	83	99	100	--	--
05..	1214	430	--	11.2	4.26	869	--	64	70	97	100	--	--
05..	1217	430	--	12.1	4.07	850	--	65	72	96	100	--	--
05..	1220	430	--	12.6	4.22	835	--	64	71	98	100	--	--
05..	1225	430	--	--	--	657	--	80	87	99	100	--	--
05..	1240	540	13.6	3.10	4.28	506	--	93	98	100	100	--	--
05..	1243	540	--	6.80	4.37	546	--	92	96	99	100	--	--
05..	1246	540	--	9.70	3.98	572	--	88	93	99	100	--	--
05..	1249	540	--	11.3	3.66	567	--	84	90	97	100	--	--
05..	1252	540	--	12.2	3.72	588	--	83	89	98	100	--	--
05..	1255	540	--	12.8	--	--	--	--	--	--	--	--	--
05..	1300	540	--	--	--	549	--	92	96	99	100	--	--

MISSOURI RIVER MAIN STEM

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06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	SAMPLE	DEPTH			SED.	SED.	SED.	SED.	SED.		
		LOC- ATION, CROSS SECTION	LOC- ATION, L BANK)	TOTAL (FEET)	SAM- PLING (FEET)	STREAM DEPTH (FEET)	VELOC- ITY (FPS)	SEDI- MENT, POINT	SUS- PENDED (MG/L)	% FINE THAN (0004 MM)	% FINE THAN (062 MM)	% FINE THAN (125 MM)	% FINE THAN (250 MM)
JUL												
24...		WATER TEMPERATURE, 22.0 °C (1020-1310);										
24...	1025	150	16.6	3.80	4.89	299	--	82	91	100	--	
24...	1029	150	--	8.30	4.54	355	--	87	93	98	100	
24...	1033	150	--	11.9	3.94	369	--	81	88	98	100	
24...	1037	150	--	13.8	3.50	498	--	68	75	96	100	
24...	1041	150	--	14.9	3.18	487	--	66	74	96	100	
24...	1045	150	--	15.6	3.02	512	--	58	63	86	100	
24...	1050	150	--	--	--	338	--	83	89	99	100	
24...	1100	250	15.2	3.50	5.17	368	--	81	90	100	--	
24...	1103	250	--	7.60	4.91	421	--	72	82	100	--	
24...	1106	250	--	10.9	4.26	577	--	57	70	99	100	
24...	1109	250	--	12.7	3.96	688	--	48	60	98	100	
24...	1112	250	--	13.7	3.61	783	--	44	55	96	100	
24...	1115	250	--	14.3	3.50	941	--	35	47	93	100	
24...	1120	250	--	--	--	539	--	58	69	97	100	
24...	1135	350	14.8	3.40	4.91	--	--	--	--	--	--	
24...	1138	350	--	7.40	4.33	--	--	--	--	--	--	
24...	1141	350	--	10.6	4.04	--	--	--	--	--	--	
24...	1144	350	--	12.3	3.76	--	--	--	--	--	--	
24...	1147	350	--	13.3	3.28	--	--	--	--	--	--	
24...	1150	350	--	13.9	3.00	--	--	--	--	--	--	
24...	1155	350	--	--	--	558	--	57	73	99	100	
24...	1200	350	--	--	--	502	16	49	--	--	--	
24...	1210	470	13.2	3.10	4.63	343	--	88	95	100	--	
24...	1213	470	--	6.60	4.37	388	--	84	92	99	100	
24...	1216	470	--	9.40	3.72	400	--	71	82	99	100	
24...	1219	470	--	11.0	3.72	429	--	73	83	99	100	
24...	1222	470	--	11.9	3.50	551	--	51	63	91	100	
24...	1225	470	--	12.4	3.28	642	--	49	60	88	100	
24...	1230	470	--	--	--	386	--	73	85	98	100	
24...	1245	625	16.0	3.70	3.61	269	--	99	99	100	--	
24...	1248	625	--	8.00	3.37	278	--	97	99	100	--	
24...	1251	625	--	11.4	2.96	266	--	98	100	--	--	
24...	1253	625	--	13.3	2.96	281	--	99	100	--	--	
24...	1257	625	--	14.4	2.44	263	--	96	99	100	--	
24...	1300	625	--	15.1	2.24	325	--	89	96	99	100	
24...	1305	625	--	--	--	274	--	97	100	--	--	

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE,	NUMBER	BED	BED	BED	BED	BED	BED	BED	BED	BED
		INST. CUBIC FEET SECOND PER SECOND	OF SIEVE SAM- DIAM.	MAT. MAT. DIAM.	MAT. MATERIAL DIAM.							
OCT												
17...	1330	32000	5	--	0	9	40	71	90	97	99	100
JUN												
05...	1310	37100	5	--	0	12	46	78	93	99	100	--
JUL												
24...	1325	33000	5	0	1	20	58	79	91	98	100	--

NISHNABOTNA RIVER BASIN

06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IA

LOCATION.--Lat 41°23'24", long 95°22'17", in NW1/4 NE1/4 sec.18, T.76 N., R.39 W., Pottawattamie County, Hydrologic Unit 10240002, on right bank at upstream side of bridge on county highway G30, 0.6 mi west of Hancock school, 3.0 mi downstream from Jim Creek, 59.6 mi upstream from confluence with East Nishnabotna River, and at mile 75.1 mi upstream from mouth of Nishnabotna River.

DRAINAGE AREA.--609 mi².

PERIOD OF RECORD.--October 1959 to current year.

GAGE.--Water-stage encoder. Datum of gage is 1,085.83 ft above NGVD. Prior to Sept. 15, 1980, on downstream end of right pier at same datum.

REMARKS.--Estimated daily discharges: Nov. 16-21, 23-25, Nov. 28 to Feb. 11, and Feb. 13-28. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--31 years, 297 ft³/s, 6.62 in/yr, 215,200 acre-ft/yr; median of yearly mean discharges, 240 ft³/s, 5.4 in/yr, 174,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,400 ft³/s Sept. 13, 1972, gage height, 22.12 ft; minimum daily discharge, 2.2 ft³/s Feb. 8, 9, 1971.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 13	2300	6,700	11.70	June 17	1900	*16,400	* 18.33
June 15	2000	7,570	12.44	July 26	0700	4,140	9.19
June 16	1500	6,560	11.57				

Minimum daily discharge, 37 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	179	133	96	78	96	74	258	145	371	508	531	226
2	171	125	90	84	70	81	235	140	364	473	526	230
3	162	124	78	100	74	71	221	140	394	477	519	234
4	160	124	84	92	88	61	219	165	346	439	494	225
5	188	123	115	80	105	59	209	170	321	675	455	213
6	235	120	90	74	96	54	196	153	311	629	437	205
7	195	117	75	72	94	57	197	144	301	475	413	198
8	181	115	60	78	100	173	203	137	337	452	396	194
9	175	111	75	90	84	823	203	294	319	436	363	193
10	168	109	88	100	84	535	208	270	286	581	341	188
11	161	108	60	110	92	376	192	247	271	887	565	183
12	157	106	66	90	98	277	187	237	263	514	421	179
13	152	105	82	70	90	288	197	254	2310	504	350	176
14	151	106	68	74	45	556	195	251	2410	462	319	172
15	151	103	50	80	70	504	188	247	4000	431	307	166
16	189	64	45	90	120	415	183	247	4140	416	290	164
17	202	58	52	100	110	413	185	239	11700	383	294	162
18	164	66	60	110	100	450	179	221	9670	354	287	176
19	155	80	56	96	96	430	172	946	1810	385	262	196
20	154	120	54	92	86	398	176	837	1310	909	265	184
21	155	100	45	86	82	377	173	448	1070	479	625	175
22	155	104	37	84	76	357	166	381	1120	405	374	169
23	151	62	39	100	92	329	155	600	1110	368	318	160
24	145	56	41	110	84	307	150	526	839	350	299	160
25	139	90	45	100	70	302	147	1310	744	533	342	163
26	139	105	49	100	80	287	147	823	711	3090	465	158
27	135	103	54	105	95	265	153	554	639	1500	303	157
28	132	70	66	96	82	266	161	489	595	927	274	156
29	132	60	86	94	---	271	153	441	571	817	260	151
30	133	72	98	100	---	259	148	407	541	641	246	151
31	135	---	88	92	---	263	---	381	---	556	235	---
TOTAL	5001	2940	2092	2827	2469	9378	5556	11844	49174	20056	11576	5464
MEAN	161	98.0	67.5	91.2	88.2	303	185	382	1639	647	373	182
MAX	235	133	115	110	120	823	258	1310	11700	3090	625	234
MIN	132	56	37	70	45	54	147	137	263	350	235	151
AC-FT	9920	5830	4150	5610	4900	18600	11020	23490	97540	39780	22960	10840
CFSM	.26	.16	.11	.15	.14	.50	.30	.63	2.69	1.06	.61	.30
IN.	.31	.18	.13	.17	.15	.57	.34	.72	3.00	1.23	.71	.33

CAL YR 1989 TOTAL 72239 MEAN 198 MAX 11700 MIN 30 AC-FT 143300 CFSM .32 IN. 4.41
WTR YR 1990 TOTAL 128377 MEAN 352 MAX 11700 MIN 37 AC-FT 254600 CFSM .58 IN. 7.84

NISHNABOTNA RIVER BASIN

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06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IA

LOCATION.--Lat $40^{\circ}52'23''$, long $95^{\circ}34'48''$, in NE1/4 NE1/4 sec.17, T.70 N., R.41 W., Fremont County, Hydrologic Unit 10240002, on right bank at upstream side of bridge on State Highway 184, 0.3 mi downstream from Deer Creek, 0.5 mi west of Randolph, and 16.0 mi upstream from confluence with East Nishnabotna River, and at mile 31.5 upstream from mouth of Nishnabotna River.

DRAINAGE AREA.--1,326 mi².

PERIOD OF RECORD.--June 1948 to current year.

REVISED RECORDS.--WSP 1440: Drainage area. WDR IA-74-1: 1973 (M). WDR IA-76-1: 1975 (P).

GAGE.--Water-stage recorder. Datum of gage is 932.99 ft above NGVD, unadjusted. Prior to Aug. 26, 1955, non-recording gage with supplementary water-stage recorder operating above 8.4 ft June 30, 1949 to Aug. 25, 1955 at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 17-19, 23-25, Nov. 29 to Jan. 26, Feb. 2-9, 13-20, and Feb. 25-28. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--42 years, 591 ft³/s, 6.05 in/yr, 428,200 acre-ft/yr; median of yearly mean discharges, 520 ft³/s, 5.3 in/yr, 377,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,800 ft³/s May 26, 1987, gage height, 24.50 ft, from rating curve extended above 35,800 ft³/s; maximum gage height, 24.8 ft Mar. 5, 1949, from graph based on gage readings, backwater from ice; minimum daily discharge, 10 ft³/s Dec. 17-21, 1955.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of about 24 ft, discharge not determined, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 16	0945	7,080	16.78	July 26	0215	*31,300	*23.55
June 17	0515	7,920	17.62	Aug. 12	1615	8,180	17.88
June 19	0145	11,100	20.03				

Minimum daily discharge, 74 ft³/s Feb. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	345	261	142	154	179	153	423	233	810	1090	1610	470
2	316	250	161	148	110	152	411	229	791	1050	1660	474
3	303	244	125	210	118	155	388	237	769	1010	1800	523
4	294	239	167	190	134	149	378	296	795	967	1740	476
5	307	237	215	163	194	143	372	314	746	1050	1590	454
6	365	229	175	149	160	143	359	295	715	1260	1510	430
7	394	222	150	140	157	179	337	267	782	1160	1430	412
8	349	221	122	162	170	228	323	249	877	1010	1410	397
9	313	219	130	176	165	423	331	803	761	967	1390	388
10	295	219	170	198	186	876	327	915	705	995	1360	381
11	285	214	142	212	176	674	317	530	658	1180	1410	375
12	274	211	138	190	182	516	308	525	634	1420	4100	365
13	267	213	178	134	150	428	312	506	781	1080	1380	356
14	259	205	150	140	74	518	325	470	3830	1030	961	342
15	259	203	96	148	88	743	326	461	1950	969	889	330
16	276	189	90	167	106	748	316	471	5680	907	834	321
17	313	155	115	179	159	675	312	463	5870	862	753	315
18	335	120	110	202	227	703	301	430	9100	817	694	347
19	291	145	100	180	209	719	296	440	5640	790	1110	367
20	287	235	97	166	196	658	296	1190	2350	1010	932	378
21	286	241	96	150	189	588	295	931	2060	1370	683	365
22	285	222	77	130	174	557	292	666	2210	965	929	353
23	284	160	80	136	168	518	288	640	1940	858	726	332
24	276	130	89	160	178	470	284	962	1790	817	642	322
25	269	170	94	155	120	433	281	2820	1510	4450	652	317
26	264	235	102	160	115	421	263	2040	1400	20200	644	308
27	261	217	111	181	145	412	256	1260	1320	4600	782	300
28	261	170	124	151	142	406	253	1100	1250	2620	590	291
29	261	86	204	163	---	427	248	939	1180	2140	545	282
30	266	96	176	176	---	435	244	882	1140	1930	513	280
31	268	---	160	152	---	429	---	832	---	1710	489	---
TOTAL	9108	5958	4086	5122	4371	14079	9462	22396	61044	62284	35758	11051
MEAN	294	199	132	165	156	454	315	722	2035	2009	1153	368
MAX	394	261	215	212	227	876	423	2820	9100	20200	4100	523
MIN	259	86	77	130	74	143	244	229	634	790	489	280
AC-FT	18070	11820	8100	10160	8670	27930	18770	44420	121100	123500	70930	21920
CFSM	.22	.15	.10	.12	.12	.34	.24	.54	1.53	1.52	.87	.28
IN.	.26	.17	.11	.14	.12	.39	.27	.63	1.71	1.75	1.00	.31

CAL YR 1989 TOTAL 135209 MEAN 370 MAX 16200 MIN 46 AC-FT 268200 CFSM .28 IN. 3.79
WTR YR 1990 TOTAL 244719 MEAN 670 MAX 20200 MIN 74 AC-FT 485400 CFSM .51 IN. 6.87

NISHNABOTNA RIVER BASIN

06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IA

LOCATION.--Lat 41°20'46", long 95°04'36", in NW1/4 NW1/4 sec.35, T.76 N., R.37 W., Cass County, Hydrologic Unit 10240003, on left bank at downstream side of bridge on county highway, 1.6 mi upstream from Turkey Creek, 5.2 mi southwest of junction of U.S. Highway 6 and State Highway 83 in Atlantic, 69.1 mi upstream from confluence with West Nishnabotna River, and at mile 84.6 upstream from mouth of Nishnabotna River.

DRAINAGE AREA.--436 mi².

PERIOD OF RECORD.--October 1960 to current year.

GAGE.--Water-stage encoder. Datum of gage is 1,105.83 ft above NGVD. Prior to Oct. 1, 1970, at site 2.2 mi upstream at datum 5.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 16-18, 23, 28-30, Dec. 2-5, Dec. 7 to Feb. 7, Feb. 14-26. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--30 years, 224 ft³/s, 6.98 in/yr, 162,300 acre-ft/yr; median of yearly mean discharges, 220 ft³/s, 6.9 in/yr, 159,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,700 ft³/s Sept. 12, 1972, gage height, 22.81 ft; minimum daily discharge, 2.5 ft³/s July 10, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 2, 1958 reached a stage of 22.49 ft, from floodmark, discharge, 34,200 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 25	0915	3,370	9.53	June 17	1030	10,400	13.95
June 16	1700	*11,900	*14.54				

Minimum daily discharge, 20 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	108	99	70	47	47	36	206	98	301	515	436	130
2	102	89	58	40	35	42	185	95	295	501	411	133
3	97	87	42	70	40	41	172	98	275	477	503	132
4	92	87	80	60	66	39	173	117	250	453	874	128
5	118	85	85	47	58	38	161	116	243	621	467	120
6	147	81	71	42	54	37	152	103	234	616	397	115
7	110	77	30	40	54	41	149	100	226	498	366	110
8	101	75	26	44	57	314	151	96	253	458	345	108
9	100	76	45	52	50	856	149	1310	229	427	329	109
10	93	73	68	64	46	390	149	593	209	570	605	105
11	92	72	45	80	48	263	137	357	198	966	474	99
12	87	70	32	47	50	235	131	325	193	602	340	98
13	85	71	43	38	51	364	137	321	445	892	308	94
14	84	70	32	41	25	594	145	303	706	646	281	92
15	85	71	23	52	38	603	134	288	944	552	264	92
16	105	54	26	66	66	646	130	354	5810	501	255	91
17	124	45	30	84	58	540	132	291	6500	465	251	90
18	103	49	35	76	52	450	124	259	1570	439	239	99
19	92	83	32	68	50	364	121	363	1040	622	220	109
20	90	82	27	60	48	326	124	402	885	624	212	100
21	89	69	23	50	44	310	121	278	745	514	209	98
22	89	64	20	40	52	288	118	259	1000	465	206	92
23	86	38	21	50	60	251	115	322	1690	432	197	89
24	84	64	23	70	50	231	112	302	899	409	192	88
25	83	78	26	56	40	225	109	1840	768	423	204	90
26	82	63	29	45	42	213	107	785	706	1450	185	87
27	82	65	33	64	49	206	106	517	657	900	167	86
28	78	46	50	45	35	202	107	426	612	685	157	86
29	83	28	70	37	---	208	104	370	578	809	154	86
30	92	58	62	54	---	208	100	329	544	558	148	87
31	104	---	56	38	---	208	---	304	---	476	144	---
TOTAL	2967	2069	1313	1667	1365	8769	4061	11721	29005	18566	9540	3043
MEAN	95.7	69.0	42.4	53.8	48.7	283	135	378	967	599	308	101
MAX	147	99	85	84	66	856	206	1840	6500	1450	874	133
MIN	78	28	20	37	25	36	100	95	193	409	144	86
AC-FT	5890	4100	2600	3310	2710	17390	8050	23250	57530	36830	18920	6040
CFSM	.22	.16	.10	.12	.11	.65	.31	.87	2.22	1.37	.71	.23
IN.	.25	.18	.11	.14	.12	.75	.35	1.00	2.47	1.58	.81	.26

CAL YR 1989 TOTAL 49393 MEAN 135 MAX 13100 MIN 13 AC-FT 97970 CFSM .31 IN. 4.21
WTR YR 1990 TOTAL 94086 MEAN 258 MAX 6500 MIN 20 AC-FT 186600 CFSM .59 IN. 8.03

NISHNABOTNA RIVER BASIN

215

06809500 EAST NISHNABOTNA RIVER AT RED OAK, IA

LOCATION.--Lat 41°00'31", long 95°14'29", in NW1/4 SE1/4 sec.29, T.72 N., R.38 W., Montgomery County, Hydrologic Unit 10240003, on upstream side of Coolbaugh Street and 200 ft left of left end of Coolbaugh Street bridge in Red Oak, and 0.2 mi upstream from Red Oak Creek, 38.0 mi upstream from confluence with West Nishnabotna River, and at mile 53.6 upstream from mouth of Nishnabotna River.

DRAINAGE AREA.--894 mi².

PERIOD OF RECORD.--May 1918 to July 1925, May 1936 to current year. Monthly discharge only for some periods, published in WSP 1310.

REVISED RECORDS.--WSP 1240: 1921, 1922-23 (M), 1924, 1942 (M), 1944 (M), 1946. WSP 1440: Drainage area. WSP 1710: 1957.

GAGE.--Water-stage recorder. Datum of gage is 1,005.45 ft above NGVD. Prior to July 5, 1925, nonrecording gage at present site at datum 4.60 ft higher. May 29, 1936, to Nov. 13, 1952, nonrecording gage with supplementary water-stage recorder in operation above 3.2 ft gage height July 30, 1939, to Nov. 13, 1952, and Nov. 14, 1952, to June 13, 1966, water-stage recorder, all at site 0.5 mi upstream at datum 5.00 ft higher. June 14, 1966, to Sept. 30, 1969, at present site at datum 5.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 17-19, 23-25, Nov. 28 to Jan. 27, Feb. 2-9, and 13-28. Records good except those for daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--60 years (water years 1919-24, 1937-90), 395 ft³/s, 6.00 in/yr, 286,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,000 ft³/s Sept. 13, 1972, gage height, 27.43 ft; maximum gage height, 28.23 ft June 13, 1947, present datum; minimum daily discharge, 6 ft³/s Aug. 18, 1936.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 25	1345	8,490	16.07	June 17	1800	12,000	18.60
June 17	0200	*13,000	*19.25	July 26	0130	4,960	12.85

Minimum discharge, 43 ft³/s Feb. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	243	227	128	110	129	108	388	174	657	643	587	247
2	232	208	139	100	90	107	367	168	630	610	547	257
3	216	196	100	134	90	112	331	170	594	598	540	250
4	208	193	110	130	118	109	316	192	536	545	1140	238
5	217	193	170	109	128	107	312	216	491	567	774	226
6	296	188	150	99	127	106	285	196	477	844	554	212
7	297	185	108	96	123	117	266	178	478	615	481	200
8	236	180	78	110	135	151	263	169	508	551	445	193
9	226	177	100	120	131	1040	273	2020	508	497	425	188
10	221	176	130	130	129	754	268	2120	438	529	411	190
11	214	171	98	148	125	553	262	864	398	1060	964	183
12	211	169	82	130	125	438	239	651	374	947	823	174
13	203	167	118	90	123	377	234	640	381	929	509	169
14	199	167	90	92	49	1070	260	565	1720	980	440	162
15	199	169	64	100	58	1390	261	553	1120	715	407	154
16	221	159	62	113	70	1280	238	524	6380	613	387	150
17	251	120	70	157	105	1080	222	558	10900	545	377	149
18	239	110	84	150	150	910	213	438	4260	492	366	168
19	208	130	74	140	138	731	205	417	2000	502	342	182
20	197	189	73	130	130	614	209	675	1560	717	351	192
21	196	176	64	120	120	573	214	474	1320	681	349	173
22	198	162	51	110	110	547	208	407	1500	540	335	162
23	193	120	52	120	96	503	200	533	2390	482	324	151
24	187	100	55	138	120	445	193	822	1530	534	311	147
25	185	130	62	130	96	423	189	5160	1170	750	322	147
26	184	169	66	130	90	407	185	2700	1020	3250	339	147
27	182	150	73	137	120	392	183	1450	922	1940	296	144
28	182	120	84	127	111	382	186	1160	824	1120	272	136
29	186	57	120	126	---	384	189	946	748	926	262	133
30	194	80	128	134	---	396	180	806	690	949	257	134
31	210	---	120	121	---	387	---	709	---	666	251	---
TOTAL	6631	4738	2903	3781	3136	15993	7339	26655	46524	25337	14188	5358
MEAN	214	158	93.6	122	112	516	245	860	1551	817	458	179
MAX	297	227	170	157	150	1390	388	5160	10900	3250	1140	257
MIN	182	57	51	90	49	106	180	168	374	482	251	133
AC-FT	13150	9400	5760	7500	6220	31720	14560	52870	92280	50260	28140	10630
CFSM	.24	.18	.10	.14	.13	.58	.27	.96	1.73	.91	.51	.20
IN.	.28	.20	.12	.16	.13	.67	.31	1.11	1.94	1.05	.59	.22

CAL YR 1989 TOTAL 108498 MEAN 297 MAX 19700 MIN 38 AC-FT 215200 CFSM .33 IN. 4.51
WTR YR 1990 TOTAL 162583 MEAN 445 MAX 10900 MIN 49 AC-FT 322500 CFSM .50 IN. 6.77

NISHNABOTNA RIVER BASIN

06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA
(National stream-quality accounting network station)

LOCATION.--Lat 40°37'57", long 95°37'32", in SW1/4 SE1/4 sec.11, T.67 N., R.42 W., Fremont County, Hydrologic Unit 10240004, on left bank 1.7 mi downstream from confluence of East Nishnabotna and West Nishnabotna Rivers, 2 mi northeast of Hamburg, and at mile 13.8.

DRAINAGE AREA.--2,806 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1922 to September 1923, October 1928 to current year. Monthly discharge only for some periods published in WSP 1310.

REVISED RECORDS.--WSP 1240: 1923, 1929-37, 1938-40 (M), 1943 (M). WSP 1440: Drainage area. WDR IA-74-1: 1973.

GAGE.--Water-stage encoder. Datum of gage is 894.17 ft above NGVD. See WSP 1730 for history of changes prior to Nov. 16, 1950.

REMARKS.--Estimated daily discharges: Nov. 17-19, 23-25, Nov. 29 to Jan. 26, Feb. 2-9, and Feb. 13-28. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE--63 years (water years 1923, 1929-90), 1,120 ft³/s, 5.42 in/yr, 811,400 acre-ft/yr; median of yearly mean discharges, 950 ft³/s, 4.6 in/yr, 688,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 55,500 ft³/s June 24, 1947, gage height, 26.03 ft, from flood-mark, present site and datum; maximum gage height, 28.27 ft Sept. 10, 1989; minimum daily discharge, 4.5 ft³/s Aug. 30, 1934.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 26	0200	13,100	21.72	July 27	0100	*32,000	*28.06
June 18	1900	28,200	27.02	Aug. 12	2030	15,900	22.92

Minimum daily discharge, 160 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	800	566	290	330	388	357	994	525	1650	2160	3840	870
2	753	575	310	310	250	332	966	507	1600	2020	3210	856
3	718	567	240	430	260	330	903	511	1530	1900	3520	930
4	681	552	308	400	315	337	840	628	1480	1790	3080	868
5	690	541	428	340	402	331	809	640	1420	1770	2930	828
6	758	536	361	310	398	321	793	642	1350	1900	2380	787
7	839	524	328	295	363	379	760	587	1760	2300	2150	766
8	847	508	250	340	376	491	737	528	1990	1810	1990	753
9	744	500	252	370	411	593	746	801	1520	1670	1850	729
10	672	489	333	410	413	1880	763	3680	1410	1730	1760	712
11	621	485	266	450	393	1520	732	2160	1260	1840	1870	698
12	588	472	244	400	389	1350	723	1630	1190	2550	7400	680
13	566	471	370	280	310	1050	732	1550	1150	2160	7150	662
14	543	466	300	290	154	1170	752	1420	6640	2100	2900	636
15	559	466	200	310	182	2070	751	1410	4890	1980	2240	619
16	573	438	190	350	220	2280	736	1460	9590	1730	2110	608
17	640	340	206	420	310	2170	734	1310	22200	1570	1760	600
18	706	310	250	440	418	2000	708	1260	27000	1450	1520	666
19	655	350	235	370	434	1850	693	1150	20900	1370	1450	732
20	587	458	230	335	408	1650	672	1440	6760	1630	2220	737
21	574	530	200	300	378	1460	664	2050	5000	2130	1410	750
22	576	510	160	300	346	1380	654	1360	5050	1800	1550	700
23	572	378	165	320	301	1310	629	1230	4460	1510	1380	658
24	557	280	180	390	350	1210	605	1760	4540	1370	1250	627
25	540	409	195	370	301	1110	588	4780	3430	5050	1190	599
26	531	527	210	375	282	1070	582	8460	3050	28700	1170	579
27	516	555	230	417	330	1030	569	3420	2830	22500	1290	579
28	522	464	260	369	349	1000	572	2560	2630	14600	1100	563
29	544	179	405	368	---	1010	559	2170	2440	8860	1010	562
30	554	220	380	386	---	1010	551	1930	2290	6450	953	558
31	577	---	350	348	---	1020	---	1770	---	4970	908	---
TOTAL	19603	13666	8326	11123	9431	35071	21517	55329	153010	135370	70541	20912
MEAN	632	456	269	359	337	1131	717	1785	5100	4367	2276	697
MAX	847	575	428	450	434	2280	994	8460	27000	28700	7400	930
MIN	516	179	160	280	154	321	551	507	1150	1370	908	558
AC-FT	38880	27110	16510	22080	18710	69560	42680	109700	303500	268500	139900	41480
CFSM	.23	.16	.10	.13	.12	.40	.26	.64	1.82	1.56	.81	.25
IN.	.26	.18	.11	.15	.13	.46	.29	.73	2.03	1.79	.94	.28

CAL YR 1989 TOTAL 302661 MEAN 829 MAX 29900 MIN 110 AC-FT 600300 CFSM .30 IN. 4.01
WTR YR 1990 TOTAL 553899 MEAN 1518 MAX 28700 MIN 154 AC-FT 1099000 CFSM .54 IN. 7.34

NISHNABOTNA RIVER BASIN

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06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA--Continued
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1979 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April 1979 to September 1981.
WATER TEMPERATURES: April 1979 to September 1981.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 815 microsiemens Sept. 16, 18, 19, 28, 30, 1979; minimum daily, 155 microsiemens, July 20, 1981.

WATER TEMPERATURES: Maximum daily, 32.0°C July 14, 1980; minimum daily 0.0°C, on many days during winter period.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT) (00301)	BARO- METRIC PRES- SURE (MM) (00025)	COLI- FORM, FECAL, UM-MF (COLS./ 100 ML) (31625)	
NOV 02...	0930	567	570	7.8	5.0	3.0	5.0	12.9	103	745	1100	
FEB 22...	1100	424	559	7.8	0.0	3.0	16	13.8	98	732	230	
MAR 05...	1300	348	580	7.7	7.5	16.0	72	11.5	99	737	96	
MAY 01...	1215	529	540	7.9	12.5	10.0	18	10.7	103	742	37	
JUL 09...	1200	1710	750	7.9	27.0	29.0	180	6.8	88	738	6000	
AUG 17...	1100	1780	495	8.2	24.5	26.5	170	6.4	80	732	17000	
		STREP- TOCCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- LILITY WAT DIS TOT IT FIELD MG/L AS CACO3 (00935) (39086)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (00452) (00453)	CAR- BONATE WATER DIS IT FIELD MG/L AS HCO3	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3
NOV 02...	350	280	74	22	13	9	0.3	3.4	234	0	E285	
FEB 22...	100	--	74	22	13	--	--	2.7	232	0	283	
MAR 05...	28	--	73	21	12	--	--	3.0	227	0	277	
MAY 01...	51	290	75	24	12	8	0.3	2.5	228	0	278	
JUL 09...	1000	260	71	20	10	8	0.3	3.1	200	0	245	
AUG 17...	25000	250	69	19	9.7	8	0.3	4.0	192	0	234	
		SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NO2+NO3 ORGANIC DIS- SOLVED (MG/L AS N) (00605)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00613)
NOV 02...	41	13	0.30	8.2	341	325	0.46	522	0.46	2.10	0.010	
FEB 22...	43	14	0.30	14	347	--	--	--	0.33	2.90	0.050	
MAR 05...	45	14	0.30	13	345	--	--	--	0.46	2.60	0.040	
MAY 01...	31	11	0.20	10	320	319	0.44	457	--	3.50	0.010	
JUL 09...	34	16	0.40	16	325	326	0.44	1500	0.48	7.80	0.020	
AUG 17...	29	10	0.40	16	315	275	0.43	1510	0.83	0.400	0.020	

NISHNABOTNA RIVER BASIN

06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

TARKIO RIVER BASIN

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06811840 TARKIO RIVER AT STANTON, IA

LOCATION.--Lat 40°58'52", long 95°06'32", in NW1/4 SW1/4 sec.4, T.71 N., R.37 W., Montgomery County, Hydrologic Unit 10240005, on right bank 10 ft downstream from bridge on county highway H42, 0.1 mi downstream from Little Tarkio Creek, and 0.5 mi west of Stanton.

DRAINAGE AREA.--49.3 mi².

PERIOD OF RECORD.--October 1957 to current year. Annual maximum, water years 1952-57.

REVISED RECORDS.--WSP 1919: 1960 (M).

GAGE.--Water-stage recorder and concrete and wood control. Datum of gage is 1,104.67 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 17, 18, 27-30, Dec. 7-9, Jan. 20-22, Feb. 3, 14-16, and Feb. 23. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--33 years, 28.6 ft³/s, 7.88 in/yr, 20,720 acre-ft/yr; median of yearly mean discharges, 25 ft³/s, 6.9 in/yr, 18,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,500 ft³/s June 9, 1967, gage height, 28.56 ft, from rating curve extended above 1,600 ft³/s on basis of slope-area measurement of peak flow; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 25	0630	1,750	13.56	July 26	0400	1,630	13.36
July 25	2145	*3,360	*16.09				

Minimum discharge, 0.17 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.4	4.8	4.4	2.9	3.8	2.2	24	5.5	35	14	27	2.9
2	5.0	4.7	4.4	2.4	2.8	2.4	18	5.6	32	12	28	3.6
3	5.1	4.7	4.0	3.0	2.3	2.6	16	7.7	26	7.6	26	3.7
4	5.3	4.8	4.4	3.9	2.5	2.5	15	21	24	6.2	24	3.1
5	5.7	4.7	4.7	3.6	3.0	2.6	6.8	13	25	9.9	21	2.9
6	5.6	4.6	4.9	2.8	3.5	2.8	6.5	10	23	8.7	19	2.7
7	5.4	4.8	4.0	2.4	3.4	4.2	8.4	6.4	57	8.9	18	2.5
8	5.6	4.8	3.7	2.4	3.8	6.0	7.9	6.0	31	5.9	17	2.5
9	5.5	4.7	4.2	3.3	3.7	5.4	11	57	24	5.7	15	2.4
10	5.6	4.5	4.7	4.4	3.3	5.5	8.7	18	21	14	15	2.4
11	5.4	4.4	3.9	4.4	3.3	5.7	6.1	12	21	7.4	18	2.4
12	5.3	4.5	2.9	3.6	3.6	5.3	6.1	19	20	19	48	2.4
13	5.2	4.5	2.3	2.3	3.7	5.3	10	19	34	23	19	2.4
14	5.2	4.5	2.6	2.1	2.0	23	11	18	31	10	14	2.4
15	5.1	4.5	2.0	2.7	1.6	50	7.7	33	74	6.2	12	2.5
16	5.0	4.1	1.1	3.9	1.8	77	11	39	197	5.8	12	2.5
17	4.9	3.7	.49	4.8	2.5	102	14	32	145	5.4	9.0	2.5
18	4.8	4.0	.35	4.0	2.4	68	12	32	52	5.1	5.7	2.6
19	4.7	4.3	.59	3.2	2.5	48	15	38	49	5.6	4.9	2.6
20	4.9	4.5	1.3	2.9	2.2	41	17	30	38	11	5.0	2.5
21	5.0	4.5	.97	2.7	2.4	37	16	33	65	5.7	5.1	2.6
22	5.1	4.3	.49	3.0	3.3	29	11	33	81	5.3	5.0	2.6
23	5.0	4.2	.36	3.8	2.7	21	10	35	43	4.8	5.0	2.5
24	5.0	4.4	.25	4.6	3.5	21	8.1	20	37	4.8	4.6	2.6
25	4.8	4.5	.39	4.2	2.9	20	6.3	502	32	617	4.3	2.6
26	4.7	4.4	1.3	3.6	2.4	20	6.1	93	29	602	3.9	2.6
27	4.7	4.0	2.5	4.0	2.5	17	6.2	69	23	102	3.5	2.6
28	4.7	3.6	3.8	3.5	2.5	18	6.3	58	21	80	3.2	2.7
29	4.8	3.8	4.2	3.1	--	23	5.9	47	18	52	3.2	2.7
30	4.8	4.1	4.0	3.4	--	21	5.8	40	16	37	3.1	2.7
31	4.8	--	3.4	3.0	--	26	--	37	--	29	3.0	--
TOTAL	158.1	131.9	82.59	103.9	79.9	714.5	313.9	1389.2	1324	1731.0	401.5	79.7
MEAN	5.10	4.40	2.66	3.35	2.85	23.0	10.5	44.8	44.1	55.8	13.0	2.66
MAX	5.7	4.8	4.9	4.8	3.8	102	24	502	197	617	48	3.7
MIN	4.7	3.6	.25	2.1	1.6	2.2	5.8	5.5	16	4.8	3.0	2.4
AC-FT	314	262	164	206	158	1420	623	2760	2630	3430	796	158
CFSM	.10	.09	.05	.07	.06	.47	.21	.91	.90	1.13	.26	.05
IN.	.12	.10	.06	.08	.06	.54	.24	1.05	1.00	1.31	.30	.06

CAL YR 1989 TOTAL 6708.97 MEAN 18.4 MAX 1390 MIN .06 AC-FT 13310 CFSM .37 IN. 5.06
WTR YR 1990 TOTAL 6510.19 MEAN 17.8 MAX 617 MIN .25 AC-FT 12910 CFSM .36 IN. 4.91

MISSOURI RIVER MAIN STEM

06813500 MISSOURI RIVER AT RULO, NE

LOCATION.--Lat 40°03'13", long 95°25'19", in NW1/4 NW1/4 sec.17, T.1 N., R.18 E., Richardson County, Hydrologic Unit 10240005, on right bank at downstream side of bridge on U.S. Highway 159 at Rulo, 3.2 mi upstream from Big Nemaha River, and at mile 498.0.

DRAINAGE AREA.--414,900 mi², approximately. The 3,959 mi² in Great Divide basin are not included.

PERIOD OF RECORD.--October 1949 to current year in reports of U.S. Geological Survey. Gage-height record collected at site 80 ft upstream January 1886 to December 1899 published in reports of Missouri River Commission September 1929 to September 1950 in files of Kansas City office of U.S. Army Corps of Engineers.

GAGE.--Water-stage encoder. Datum of gage is 837.23 ft above NGVD Oct. 1949 to Sept. 12, 1950, nonrecording gage at site 80 ft upstream and Sept. 13, 1950 to Apr. 19, 1983, recording gage on downstream end of middle pier, all at same datum.

REMARKS.--Records good. Flow regulated by upstream main-stem reservoirs. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--41 years, 41,170 ft³/s, 29,830,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 358,000 ft³/s Apr. 22, 1952, gage height, 25.60 ft; minimum daily discharge, 4,420 ft³/s Jan. 13, 1957; minimum gage height, 0.65 ft Jan. 7, 1971, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1881 reached a stage of 22.9 ft, from floodmark, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 120,000 ft³/s June 20, gage height, 20.35 ft; minimum daily discharge, 9,660 ft³/s Dec. 19, minimum gage height 1.46 ft Dec. 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34900	28600	15900	19500	20300	20800	30900	33500	35700	43400	48100	33700
2	34700	26300	15100	18000	19900	20900	32100	33600	35000	45300	44000	33300
3	34600	24300	16500	17300	19300	19100	31500	33400	36900	41300	42700	33400
4	34900	22800	17400	17400	18500	17800	30900	34100	35700	39400	42500	33600
5	34700	21600	16700	17500	17500	17600	30400	34300	35600	40200	39900	33700
6	35100	21100	16400	18000	16900	17100	30400	33600	37200	37400	37500	34100
7	35400	21100	17800	18500	18400	17100	30600	33500	35700	37000	36000	34000
8	35500	20300	19500	18300	19900	18000	30600	33400	41000	38200	35100	34300
9	35400	19700	18700	18100	20400	19100	31000	33100	40700	35200	35000	34400
10	35100	17900	17600	18400	21200	20600	31100	35600	36600	34400	34800	34800
11	35200	17400	17000	18900	22200	24700	31100	36200	35500	36600	35100	34800
12	35100	17900	16600	19500	21500	24300	31300	35100	37100	36000	37000	35000
13	34700	17800	16200	18900	20800	22900	31500	35100	34300	35700	46200	35100
14	34500	17500	14800	18400	20500	23300	32100	33300	42700	36000	42000	35000
15	34400	17100	13800	17900	20900	26800	32100	34800	56500	35100	38200	34800
16	34200	16900	12200	17600	21300	27100	32000	40300	72400	34400	37400	34800
17	34400	17000	10800	18700	20600	26200	32700	36100	89000	34600	37200	34800
18	33800	17000	10200	21700	18900	25300	32700	35500	109000	33600	35800	35000
19	33700	16400	9660	22400	17800	22700	33000	37000	117000	33200	35100	35300
20	33800	15900	9980	21700	17800	20600	32700	40300	118000	35000	38200	35200
21	33800	17000	11800	21200	18000	20600	32600	49200	95500	36000	36400	35600
22	33400	16900	14100	20200	19400	19900	32200	44700	74100	38400	35100	35500
23	33500	16600	14600	18800	20700	18700	32100	37100	65000	37600	35300	34600
24	33600	17100	14000	18000	21100	18700	32200	36200	60400	36900	34800	34500
25	34200	16900	13400	18200	21600	18400	32500	46800	55200	37500	34600	34000
26	34500	16600	13100	18700	20900	18100	33100	56400	49900	73600	36700	34000
27	34800	16700	14400	18500	19900	17700	33200	47800	44800	94300	37900	33800
28	34500	17200	17600	18800	20600	18600	33300	44000	43300	74100	35900	33600
29	33100	17300	20000	19000	---	21000	33600	40000	43900	60900	34900	33200
30	31900	16500	20600	18900	---	24100	33200	38100	41700	50800	34400	33200
31	30100	---	20400	19700	---	28000	---	38600	---	49700	34200	---
TOTAL	1061500	563400	476840	586700	556800	655800	958700	1180700	1655400	1331800	1168000	1031100
MEAN	34240	18780	15380	18930	19890	21150	31960	38090	55180	42960	37680	34370
MAX	35500	28600	20600	22400	22200	28000	33600	56400	118000	94300	48100	35600
MIN	30100	15900	9660	17300	16900	17100	30400	33100	34300	33200	34200	33200
AC-FT	2105000	1118000	945800	1164000	1104000	1301000	1902000	2342000	3283000	2642000	2317000	2045000

CAL YR 1989 TOTAL 11307010 MEAN 30980 MAX 114000 MIN 8190 AC-FT 22430000
WTR YR 1990 TOTAL 11226740 MEAN 30760 MAX 118000 MIN 9660 AC-FT 22270000

NODAWAY RIVER BASIN

221

06817000 NODAWAY RIVER AT CLARINDA, IA

LOCATION.--Lat $40^{\circ}44'19''$, long $95^{\circ}00'47''$, in SW1/4 NE1/4 sec.32, T.69 N., R.36 W., Page County, Hydrologic Unit 10240009, near left abutment on downstream side of bridge on State Highway 2 (city route), 0.5 mi downstream from North Branch, 1.2 mi east of city square of Clarinda, and 7.5 mi upstream from East Nodaway River.

DRAINAGE AREA.--762 mi².

WATER DISCHARGE RECORDS

PERIOD OF RECORD.--May 1918 to July 1925, May 1936 to current year. Monthly discharge only for some periods, published in WSP 1310.

REVISED RECORDS.--WSP 1240: 1918-20 (M), 1921, 1922-25 (M), 1936-38, 1942, 1943-45 (M), 1948. WSP 1440: Drainage area. WSP 1710: 1958, 1959 (P).

GAGE.--Water-stage recorder. Datum of gage is 955.36 ft above NGVD. Prior to July 5, 1925, and May 28, 1936, to Mar. 26, 1957 nonrecording gage at same site, and prior to Oct. 1, 1987, at datum 5.00 ft. higher.

REMARKS.--Estimated daily discharges: Nov. 17-19, 23-25, Nov. 28 to Jan. 26, Feb. 2-20, and Feb. 25-27. Records good except those for estimated daily discharges, which are poor. Clarinda municipal water supply is taken Nodaway River, 500 ft upstream from station. Average daily pumpage was 1.39 ft³/s. U.S. National Weather Service Limited Automatic Remote Collector (LARC) at station.

COOPERATION.--Average pumpage provided by City of Clarinda water works.

AVERAGE DISCHARGE.--60 years (1918-24, 1936-90), 351 ft³/s, 6.26 in/yr, 254,300 acre-ft/yr; median of yearly mean discharges, 280 ft³, 5.0 in/yr, 203,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,100 ft³/s June 13, 1947, gage-height, 25.3 ft, from flood-mark, from rating curve extended above 15,000 ft³/s on basis of an overflow profile and extended channel rating; minimum daily discharge, 1.0 ft³/s Sept. 5, 9, 12, 14, 1918, Dec. 9, 27-31, 1923.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1903 reached a stage of 25.4 ft, from floodmarks, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 25	1145	*19,800	*19.22	July 25	1330	10,900	14.44
June 17	0345	15,900	17.26				

Minimum daily discharge, 29 ft³/s Dec. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	128	222	71	62	119	73	385	134	599	411	289	73
2	118	184	76	55	83	74	355	124	568	382	259	70
3	110	161	48	71	94	74	316	127	534	354	273	85
4	106	155	58	78	106	73	296	168	485	327	249	76
5	114	150	103	60	102	75	288	186	441	593	233	67
6	133	142	94	49	98	76	263	168	425	753	196	61
7	182	134	58	52	107	96	244	142	781	449	174	60
8	143	128	35	62	123	580	245	127	608	383	164	60
9	124	123	52	68	113	1360	251	351	495	326	159	59
10	117	115	75	112	107	549	254	1220	415	610	152	59
11	110	113	70	135	101	515	239	510	367	486	150	56
12	105	112	50	142	96	541	216	455	338	445	235	54
13	101	111	66	78	99	407	228	446	379	624	347	55
14	98	107	53	51	65	1240	249	403	1400	586	190	53
15	97	103	37	54	40	2210	254	396	1310	418	168	51
16	98	94	40	64	57	2390	226	390	2550	353	177	49
17	183	75	47	120	71	1290	216	342	9210	309	152	47
18	156	61	57	250	88	953	203	285	1890	276	138	54
19	125	96	49	163	82	758	198	279	1200	265	136	59
20	118	125	48	100	74	645	199	298	946	385	116	59
21	115	114	40	90	80	602	199	272	963	344	112	60
22	112	102	29	83	84	561	187	240	1190	305	114	55
23	110	64	29	80	81	510	175	247	1280	262	108	51
24	104	66	32	110	100	457	187	394	894	242	99	48
25	99	82	34	230	80	436	162	9710	721	3470	96	49
26	95	104	35	190	84	416	155	3620	639	1790	92	49
27	94	96	37	154	96	387	153	1400	581	959	86	50
28	102	64	41	138	81	370	156	1110	529	951	79	51
29	112	38	60	142	---	376	155	879	484	616	73	49
30	134	46	68	123	---	389	146	737	443	444	70	48
31	176	---	64	109	---	387	---	648	---	342	72	---
TOTAL	3719	3287	1656	3275	2511	18870	6780	25808	32665	18460	4958	1717
MEAN	120	110	53.4	106	89.7	609	226	833	1089	595	160	57.2
MAX	183	222	103	250	123	2390	385	9710	9210	3470	347	85
MIN	94	38	29	49	40	73	146	124	338	242	70	47
AC-FT	7380	6520	3280	6500	4980	37430	13450	51190	64790	36620	9830	3410
CFSM	.16	.14	.07	.14	.12	.80	.30	1.09	1.43	.78	.21	.08
IN.	.18	.16	.08	.16	.12	.92	.33	1.26	1.59	.90	.24	.08

CAL YR 1989 TOTAL 106178 MEAN 291 MAX 19000 MIN 20 AC-FT 210600 CFSM .38 IN. 5.18
WTR YR 1990 TOTAL 123706 MEAN 339 MAX 9710 MIN 29 AC-FT 245400 CFSM .44 IN. 6.04

NODAWAY RIVER BASIN

06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

WATER-QUALITY RECORDS

LOCATION.--Suspended-sediment samples at normal flows and during winter periods are collected downstream from the dam, 300 ft upstream from gage. Samples at higher stages are collected from the bridge at gage or the Highway 2 bridge.

PERIOD OF RECORD.--October 1976 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1975 to current year.

WATER TEMPERATURES: October 1975 to September 1978, October 1979 to current year.

SUSPENDED-SEDIMENT DISCHARGE: October 1975 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis. Random water temperatures are on file for the 1979 water year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 600 microsiemens Aug. 22, 1982; minimum daily, 130 microsiemens June 15, 1976.

WATER TEMPERATURES: Maximum daily, 31.0°C Aug. 8, 1988; minimum daily, 0.0°C on many days during winter period.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 23,800 mg/L Apr. 17, 1978; minimum daily mean, 3 mg/L Dec. 1, 1986.

SEDIMENT LOADS: Maximum daily, 1,500,000 tons June 16, 1982; minimum daily, 0.23 ton Dec. 14, 1977.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 594 microsiemens Dec 18, 23; minimum daily, 180 microsiemens June 17.

WATER TEMPERATURE: Maximum daily, 28.0°C June 27-30, July 2, 8, Aug. 18.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 15,700 mg/L May 25; minimum daily mean, 8 mg/L Oct. 13, Nov. 30.

SEDIMENT LOADS: Maximum daily, 562,000 tons May 25; minimum daily, 0.85 ton Dec. 26.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	456	---	487	415	442	436	433	450	420	462	479	---
2	455	---	486	409	452	433	428	445	425	465	489	485
3	423	---	457	384	464	428	441	444	420	475	465	---
4	429	---	484	---	---	432	442	433	420	487	491	469
5	415	---	446	439	425	442	445	439	425	506	470	480
6	---	---	---	372	408	429	445	441	430	293	480	488
7	421	469	455	419	415	424	453	432	---	395	505	489
8	427	482	478	442	418	394	452	459	---	461	530	480
9	443	495	522	396	415	348	437	441	---	457	535	488
10	446	497	461	458	416	331	429	275	410	250	538	484
11	443	492	454	418	422	371	438	350	425	370	520	485
12	434	488	452	428	419	387	447	370	440	399	488	475
13	428	496	503	428	420	418	445	400	441	397	335	---
14	432	470	448	437	430	399	447	400	262	---	455	508
15	432	458	510	430	437	348	423	400	240	490	485	525
16	426	465	492	446	444	342	430	420	320	490	512	522
17	419	494	428	370	474	372	438	430	180	504	513	503
18	366	493	594	324	478	386	435	440	275	466	515	477
19	417	495	532	333	470	412	---	440	350	482	525	495
20	435	443	485	369	479	424	435	430	400	375	---	495
21	451	466	562	393	438	424	421	420	400	426	540	510
22	457	488	524	410	424	424	428	430	341	455	528	515
23	452	---	594	393	447	424	428	440	338	494	535	520
24	449	448	593	418	451	433	431	405	---	503	515	525
25	450	463	520	368	453	438	432	230	433	---	501	505
26	461	477	541	348	450	434	445	250	461	---	525	495
27	460	487	460	345	434	437	454	350	476	347	525	470
28	473	462	476	370	422	443	454	365	490	256	483	434
29	477	474	458	399	---	440	441	380	502	368	479	451
30	485	506	474	419	---	438	439	400	481	408	482	485
31	---	---	486	452	---	433	---	400	---	432	478	---

NODAWAY RIVER BASIN
06817000 NODAWAY RIVER AT CLARINDA, IA--Continued
WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18.0	---	---	---	---	1.0	---	13.0	19.0	27.0	22.0	---
2	16.0	---	---	---	---	10.0	13.0	15.0	20.0	28.0	23.0	27.0
3	13.0	---	---	---	---	6.0	9.0	17.0	17.0	27.0	24.0	---
4	12.0	---	---	---	---	---	13.0	13.0	16.0	26.0	22.0	25.0
5	14.0	---	---	---	---	10.0	11.0	13.0	17.0	25.0	20.0	27.0
6	---	---	---	---	---	13.0	9.0	14.0	20.0	24.0	20.0	27.0
7	12.0	8.0	---	---	---	10.0	6.0	16.0	---	26.0	20.0	26.0
8	10.0	9.0	---	---	---	6.0	10.0	19.0	---	28.0	20.0	23.0
9	13.0	8.0	---	---	---	10.0	15.0	18.0	---	17.0	22.0	22.0
10	16.0	10.0	---	---	---	9.0	10.0	12.0	23.0	25.0	23.0	25.0
11	15.0	9.0	---	---	---	14.0	9.0	12.0	22.0	22.0	24.0	24.0
12	16.0	9.0	---	---	---	15.0	---	13.0	25.0	22.0	24.0	24.0
13	20.0	12.0	---	---	---	17.0	9.0	14.0	---	20.0	20.0	---
14	17.0	9.0	---	---	---	15.0	9.0	18.0	22.0	---	24.0	20.0
15	18.0	8.0	---	---	---	10.0	12.0	19.0	22.0	22.0	22.0	20.0
16	17.0	3.0	---	---	---	7.0	13.0	18.0	23.0	---	25.0	19.0
17	12.0	3.0	---	---	---	8.0	9.0	16.0	23.0	25.0	25.0	18.0
18	10.0	4.0	---	---	---	9.0	11.0	17.0	24.0	25.0	28.0	18.0
19	9.0	5.0	---	---	---	6.0	---	17.0	25.0	26.0	25.0	18.0
20	10.0	5.0	---	---	---	6.0	12.0	15.0	24.0	25.0	---	18.0
21	9.0	5.0	---	---	---	8.0	15.0	15.0	23.0	23.0	24.0	19.0
22	19.0	7.0	---	---	---	12.0	15.0	15.0	23.0	20.0	24.0	15.0
23	12.0	---	---	---	2.0	8.0	15.0	18.0	---	22.0	25.0	12.0
24	14.0	5.0	---	---	3.0	5.0	20.0	19.0	---	22.0	24.0	13.0
25	16.0	8.0	---	---	3.0	7.0	18.0	20.0	23.0	---	25.0	15.0
26	18.0	10.0	---	---	3.0	8.0	20.0	---	25.0	---	26.0	17.0
27	17.0	9.0	---	---	5.0	11.0	16.0	---	28.0	24.0	27.0	20.0
28	16.0	2.0	---	---	5.0	14.0	17.0	21.0	8.0	25.0	26.0	18.0
29	15.0	---	---	---	---	10.0	---	---	28.0	---	27.0	16.0
30	10.0	---	---	---	---	13.0	11.0	21.0	27.0	25.0	24.0	13.0
31	---	---	---	---	---	9.0	---	18.0	---	22.0	23.0	---
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---
MAX	---	---	---	---	---	---	---	---	---	---	---	---
MIN	---	---	---	---	---	---	---	---	---	---	---	---

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD	MEAN CONCEN-	LOAD
	TRATION (MG/L)	(TONS/DAY)	TRATION (MG/L)	(TONS/DAY)	TRATION (MG/L)	(TONS/DAY)	TRATION (MG/L)	(TONS/DAY)	TRATION (MG/L)	(TONS/DAY)	TRATION (MG/L)	(TONS/DAY)
OCTOBER												
1	9	3.2	45	27	9	1.7	20	3.3	85	28	15	2.9
2	11	3.6	38	19	15	3.1	16	2.4	73	16	19	3.9
3	11	3.3	33	14	18	2.3	13	2.5	108	27	12	2.5
4	14	3.9	31	13	16	2.5	15	3.2	84	24	17	3.3
5	11	3.4	25	10	17	4.7	13	2.1	16	4.4	22	4.4
6	13	4.7	19	7.3	20	5.1	14	1.9	26	6.9	16	3.2
7	20	9.7	14	4.9	17	2.7	19	2.7	37	11	46	13
8	15	6.0	18	6.1	14	1.3	17	2.8	40	13	1130	2730
9	15	4.9	18	6.1	20	2.8	28	5.1	30	9.2	4840	18500
10	15	4.8	12	3.8	16	3.2	33	10	24	7.0	2400	3610
11	15	4.4	13	4.0	9	1.7	36	13	20	5.5	1580	2230
12	13	3.6	16	4.9	11	1.5	31	12	31	8.1	1510	2220
13	8	2.2	18	5.4	12	2.1	15	3.2	37	10	715	799
14	13	3.4	19	5.5	14	2.0	13	1.8	27	4.7	4520	21700
15	15	3.8	14	3.8	14	1.4	12	1.7	11	1.2	6980	41900
16	20	5.2	15	3.7	11	1.2	13	2.2	12	1.8	4040	27100
17	48	24	15	3.0	9	1.1	227	74	12	2.3	1840	6530
18	50	21	13	2.1	11	1.7	534	360	10	2.4	1050	2730
19	34	12	13	3.4	12	1.6	185	81	10	2.2	728	1500
20	19	6.0	15	5.0	12	1.6	52	14	10	2.0	516	900
21	14	4.2	14	4.2	11	1.2	20	4.9	10	2.2	476	772
22	14	4.2	13	3.6	12	.94	21	4.7	15	3.4	453	687
23	15	4.3	11	1.9	14	1.1	25	5.4	23	5.0	379	523
24	17	4.9	14	2.5	15	1.3	61	18	30	8.1	301	372
25	19	5.0	13	2.9	12	1.1	173	107	24	5.2	260	307
26	19	4.9	11	3.2	9	.85	143	73	22	5.0	262	295
27	20	5.0	14	3.7	12	1.2	111	46	33	8.6	258	269
28	18	4.9	13	2.2	13	1.4	98	38	20	4.5	237	237
29	18	5.3	10	1.0	12	1.9	68	27	---	---	233	236
30	18	6.6	8	.99	16	2.9	68	24	---	---	245	258
31	26	12	---	---	15	2.6	24	7.2	---	---	225	235
TOTAL	---	194.4	---	178.19	---	61.79	---	954.1	---	228.7	---	136673.2

NODAWAY RIVER BASIN

06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

WATER-QUALITY RECORDS

SEDIMENT-SUSPENDED, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

06817000 NODAWAY RIVER AT CLARINDA, IA--Continued
WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	TEMPERATURE WATER (DEG C) (00010)	INST. CUBIC FEET SECOND (00061)	DIS- CHARGE, SUS- PENDED (MG/L) (80154)	SEDI- MENT, SUS- PENDED (T/DAY) (80155)	SED. FALL DIAM. % FINER THAN .002 MM (70337)	SED. FALL DIAM. % FINER THAN .004 MM (70338)	SED. FALL DIAM. % FINER THAN .008 MM (70339)
OCT 05...	0850	13.0	105	18	5.1	--	--	--
NOV 05...	0920	13.0	105	13	3.7	--	--	--
NOV 21...	1150	3.0	113	15	4.6	--	--	--
JAN 05...	1030	0.0	59	30	4.8	--	--	--
FEB 22...	1130	1.0	90	16	3.9	--	--	--
MAR 30...	1215	6.0	382	195	201	--	--	--
MAY 11...	1045	12.0	522	3190	4500	41	50	59
JUN 22...	0845	18.0	1130	2570	7840	38	47	55
AUG 09...	1900	27.0	163	39	17	--	--	--
SEP 27...	1650	20.0	48	22	2.9	--	--	--
DATE	TIME	TEMPERATURE WATER (DEG C) (00010)	INST. CUBIC FEET SECOND (00061)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
				SUSP.	SUSP.	SUSP.	SUSP.	SUSP.
OCT 05...	--	--	--	--	--	--	--	90
NOV 05...	--	--	--	--	--	--	--	98
NOV 21...	--	--	--	--	--	--	--	91
JAN 05...	--	--	--	--	--	--	--	97
FEB 22...	--	--	--	--	--	--	--	83
MAR 30...	--	--	--	--	--	--	--	99
MAY 11...	69	77	77	77	94	99	--	
JUN 22...	70	97	98	99	100	--	--	
AUG 09...	--	--	--	--	--	--	--	98
SEP 27...	--	--	--	--	--	--	--	100

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED-MATERIAL, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	NUMBER OF SAM- PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)
OCT 05...	0915	3	1	1	8	48	85	94	97	99	100	--
NOV 21...	1210	3	1	2	9	49	83	91	94	97	98	100
JAN 05...	1015	3	1	1	9	57	88	95	97	99	100	--
FEB 22...	1130	3	0	1	15	62	92	96	97	98	100	--
MAR 30...	1200	3	1	2	14	50	72	83	91	97	100	--
MAY 11...	1100	3	1	1	4	56	85	94	98	100	--	--
JUN 22...	0945	3	1	2	21	76	94	98	100	--	--	--
AUG 09...	1915	3	2	2	12	54	79	86	91	96	100	--
SEP 27...	1655	3	1	1	6	53	91	98	100	--	--	--

PLATTE RIVER BASIN

06818750 PLATTE RIVER NEAR DIAGONAL, IA

LOCATION.--Lat. 40°46'02", long. 94°24'46", in NE1/4 NW1/4 sec. 22, T. 69 N., R. 31 W., Ringgold County, Hydrologic Unit 10240012, on left bank at downstream side of bridge on county highway, 2.2 mi upstream from Turkey Creek, 4.6 mi southwest of Diagonal, and 4.9 mi downstream from Gard Creek.

DRAINAGE AREA.--217 mi².

PERIOD OF RECORD.--April 1968 to current year.

REVISED RECORDS.--WSP 2119: 1969 (P).

GAGE.--Water-stage recorder. Datum of gage is 1,095.27 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 16-20, 24, 29, 30, Dec. 3, 4, 6-9, 11, 12, 14-29, Jan. 1-7, 13, 14, Jan. 19 to Feb. 3, Feb. 14-17, and Feb. 22-25. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--22 years, 130 ft³/s, 8.14 in/yr, 94,180 acre-ft/yr; median of yearly mean discharges, 110 ft³/s, 6.9 in/yr, 79,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,630 ft³/s Sept. 9, 1989, gage height, 23.60 ft; minimum daily discharge, 0.21 ft³/s Jan. 14, 15, 1969.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1967 reached a stage of 23.16 ft, from floodmark by local resident, discharge, 6,360 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)		Gage height (ft)		Date	Time	Discharge (ft ³ /s)		Gage height (ft)	
		May 25	2330	*5,850	*21.74			June 17	0645	3,680	17.28
June 16	1445			3,570	17.01			July 20	0330	3,090	15.74

Minimum discharge, 2.7 ft³/s Oct. 17, Sept. 27.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	46	7.6	6.0	20	16	148	40	132	58	31	7.1
2	9.8	33	7.8	5.6	12	16	128	35	120	53	28	5.9
3	10	27	6.6	6.4	13	15	105	35	105	48	27	8.5
4	11	24	6.8	6.8	15	15	94	70	103	41	27	7.7
5	9.6	23	7.3	6.0	16	14	87	71	86	37	35	6.0
6	12	20	6.6	5.8	22	14	78	51	82	37	23	5.7
7	18	20	6.2	7.0	24	362	70	44	123	37	18	5.5
8	10	17	6.0	14	27	1630	68	40	170	34	16	5.9
9	7.8	16	6.8	80	26	560	66	46	102	206	15	9.4
10	7.1	15	7.6	188	22	537	72	73	82	197	33	8.8
11	7.1	15	6.6	254	22	1510	72	47	72	278	22	5.9
12	6.5	13	6.2	76	21	556	63	93	66	86	25	5.5
13	5.4	14	7.5	16	22	491	64	201	61	88	25	4.9
14	5.0	13	6.0	17	8.0	2240	86	106	125	68	23	4.5
15	5.2	13	5.2	18	9.0	2260	78	118	140	48	18	4.3
16	5.2	11	5.0	20	11	903	71	180	1800	37	19	4.8
17	4.4	9.4	5.4	113	14	433	70	102	2740	29	27	5.1
18	11	8.4	5.8	42	16	282	62	79	584	24	21	4.7
19	9.9	9.0	5.4	18	15	208	60	81	267	89	15	4.2
20	6.7	9.4	5.2	22	16	174	72	90	238	1350	15	4.3
21	4.7	12	4.8	18	15	160	70	66	149	320	12	4.3
22	5.1	13	4.2	13	22	148	58	58	343	323	11	4.1
23	4.7	10	4.2	14	27	137	55	59	375	94	10	3.8
24	4.9	8.0	4.4	35	33	120	52	70	161	97	9.3	3.9
25	4.1	8.9	4.8	26	29	115	45	3900	121	89	8.4	4.2
26	6.6	10	5.2	14	26	107	42	2450	106	198	7.7	4.0
27	4.1	12	5.8	15	19	100	47	493	93	113	7.3	6.1
28	7.8	11	6.4	14	17	98	54	286	81	116	6.6	7.9
29	23	6.0	6.6	13	---	145	50	202	71	137	6.6	6.8
30	92	7.0	6.7	18	---	138	46	162	63	57	6.1	5.8
31	82	--	6.7	16	---	145	--	145	--	41	7.5	--
TOTAL	413.7	454.1	187.4	1117.6	539.0	13649	2133	9493	8761	4430	555.5	169.6
MEAN	13.3	15.1	6.05	36.1	19.2	440	71.1	306	292	143	17.9	5.65
MAX	92	46	7.8	254	33	2260	148	3900	2740	1350	35	9.4
MIN	4.1	6.0	4.2	5.6	8.0	14	42	35	61	24	6.1	3.8
AC-FT	821	901	372	2220	1070	27070	4230	18830	17380	8790	1100	336
CFSM	.06	.07	.03	.17	.09	2.03	.33	1.41	1.35	.66	.08	.03
IN.	.07	.08	.03	.19	.09	2.34	.37	1.63	1.50	.76	.10	.03

CAL YR 1989 TOTAL 22000.36 MEAN 60.3 MAX 7530 MIN .49 AC-FT 43640 CFSM .28 IN. 3.77
WTR YR 1990 TOTAL 41902.9 MEAN 115 MAX 3900 MIN 3.8 AC-FT 83110 CFSM .53 IN. 7.18

PLATTE RIVER BASIN

227

06819185 EAST FORK ONE HUNDRED AND TWO RIVER AT BEDFORD, IA

LOCATION.--Lat 40°39'38", long 94°42'59", in NE1/4 sec.35, T.68 N., R.34 W., Taylor County, Hydrologic Unit 10240013, on left bank at downstream side of bridge of county highway N44, 0.1 mi south of Bedford, 0.4 mi upstream from concrete stabilization dam, and 3.0 mi upstream from Daugherty creek.

DRAINAGE AREA.--85.4 mi².

PERIOD OF RECORD.--October 1983 to current year. September 1959 to September 1983, at site 2 mi upstream published as "near Bedford" (station 06819190) not equivalent because of difference in drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,069.16 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 1, 2, Nov. 24, 25, Nov. 27 to Dec. 4, Dec. 16-19, Jan. 30 to Feb. 5, and Feb. 14-16. Records fair except those for estimated daily discharges, which are poor. Slight regulation at low flow by low dam used for water supply in Bedford. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--7 years, 57.1 ft³/s, 9.08 in/yr, 41,370 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,570 ft³/s July 14, 1986, gage height 23.47 ft.; minimum daily discharge, no flow several days in July and August, 1989, Dec. 24, 1990.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 13	2315	2,020	17.38	June 17	0515	*4,150	*20.06
Mar. 14	1530	2,150	17.57	July 20	0400	2,120	17.52
May 25	1015	3,130	18.89	July 25	0945	4,020	19.92
June 16	1715	2,410	17.94				

No flow Dec. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.75	37	1.7	1.3	5.6	4.3	78	2.5	27	7.9	27	1.3
2	.50	14	1.7	1.2	4.5	4.3	47	1.9	23	7.1	20	1.3
3	.27	5.5	1.4	1.3	3.0	4.5	33	2.5	16	10	24	1.3
4	.08	5.5	1.6	1.8	3.1	4.6	33	39	7.9	6.3	19	1.2
5	.37	5.6	1.9	1.5	4.1	4.3	23	23	9.7	4.6	11	1.2
6	.02	4.9	2.6	1.9	6.9	5.0	13	7.2	9.4	5.2	7.3	1.2
7	.13	3.9	2.9	1.8	10	219	10	4.8	390	6.1	6.3	1.2
8	.04	3.2	2.6	1.7	11	417	11	4.1	171	5.7	5.7	1.2
9	.26	3.3	2.2	37	16	122	11	29	65	8.6	5.4	1.2
10	.17	2.9	1.9	105	12	156	18	27	45	97	5.8	.25
11	.43	2.6	1.9	63	6.1	317	8.7	7.4	40	140	5.5	.22
12	.06	2.5	1.8	37	4.8	130	6.3	145	30	45	11	.22
13	.39	2.6	1.7	30	5.5	292	19	107	20	103	7.7	.22
14	.14	2.0	1.5	16	3.0	1220	30	45	220	37	5.4	.22
15	.19	2.2	1.3	5.1	3.2	1050	48	93	395	19	4.4	.22
16	.51	2.6	.90	8.3	3.4	272	30	74	1170	10	62	.22
17	.10	2.5	.70	47	4.0	122	26	30	1530	6.7	22	.22
18	.04	2.0	1.2	45	3.9	75	12	12	153	5.7	7.4	.22
19	.92	1.9	.40	34	4.2	51	11	34	101	6.6	5.2	.22
20	1.0	2.2	.17	32	4.2	43	43	15	83	788	3.7	.22
21	.22	2.9	.07	18	4.4	40	34	6.9	64	148	3.8	.22
22	1.1	3.3	.02	7.9	16	42	20	5.8	175	114	3.2	.22
23	1.2	2.8	.01	7.1	44	35	14	6.7	78	49	3.2	.22
24	1.3	1.7	.00	28	42	33	8.0	28	49	33	2.6	.22
25	1.3	2.1	.01	36	39	38	5.3	1360	38	819	2.1	.22
26	1.3	2.8	.13	22	22	34	3.5	233	32	255	1.7	.22
27	1.3	2.9	.72	18	7.6	26	4.5	98	22	349	1.7	.39
28	2.8	1.6	1.3	12	4.7	33	5.1	63	16	262	1.7	1.2
29	2.6	1.0	1.5	5.5	---	102	3.0	47	12	232	1.7	1.2
30	22	1.1	1.4	3.2	---	66	2.5	34	8.1	57	1.5	1.2
31	46	--	1.5	4.2	---	102	---	29	---	38	1.5	--
TOTAL	87.49	131.1	38.73	633.8	298.2	5064.0	610.9	2614.8	5000.1	3675.5	290.5	18.86
MEAN	2.82	4.37	1.25	20.4	10.6	163	20.4	84.3	167	119	9.37	.63
MAX	46	37	2.9	105	44	1220	78	1360	1530	819	62	1.3
MIN	.02	1.0	.00	1.2	3.0	4.3	2.5	1.9	7.9	4.6	1.5	.22
AC-FT	174	260	77	1260	591	10040	1210	5190	9920	7290	576	.37
CFSM	.03	.05	.01	.24	.12	1.91	.24	.99	1.95	1.39	.11	.01
IN.	.04	.06	.02	.28	.13	2.21	.27	1.14	2.18	1.60	.13	.01

CAL YR 1989 TOTAL 6019.01 MEAN 16.5 MAX 3870 MIN .00 AC-FT 11940 CFSM .19 IN. 2.62
WTR YR 1990 TOTAL 18463.98 MEAN 50.6 MAX 1530 MIN .00 AC-FT 36620 CFSM .59 IN. 8.04

GRAND RIVER BASIN

228

06897950 ELK CREEK NEAR DECATUR CITY, IA
(Hydrologic bench-mark station)

LOCATION.--Lat. $40^{\circ}43'18''$, long $93^{\circ}56'12''$, near SE corner sec. 34, T. 69 N., R. 27 W., Decatur County, Hydrologic Unit 10280102, at right downstream corner of bridge on county highway, 1,000 ft downstream from West Elk Creek, 5.2 mi upstream from mouth, and 5.7 mi southwest of Decatur City.

DRAINAGE AREA.--52.5 mi².

WATER DISCHARGE RECORDS

PERIOD OF RECORD.--October 1967 to current year.

GAGE.--Water-stage recorder. Datum of gage is 924.70 ft above NGVD. Oct. 1, 1967, to Sept. 30, 1974, at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 23-25, 28, Nov. 30 to Dec. 2, Jan. 3-7, 11-13, Jan. 19 to Feb. 5, and Feb. 15-19. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--23 years, 31.1 ft³/s, 8.04 in/yr, 22,530 acre-ft/yr; median of yearly mean discharges, 26 ft³/s, 6.7 in/yr, 18,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft³/s July 20, 1990, gage height, 28.19 ft, estimated from rating curve extended above 5,300 ft³/s on basis of contracted-opening and flow-over-road measurement of peak flow; maximum gage height, 28.22 ft, June 2, 1980; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 14, 1967, reached a stage of 18.35 ft, datum in use prior to Oct. 1, 1974, discharge, 17,800 ft³/s, estimated from rating curve extended above 5,300 ft³/s on basis of step-backwater computation. Flood of Aug. 6, 1959, reached a stage between 20.5 and 22.5 ft, datum in use prior to Oct. 1, 1974, 300 ft downstream, from information by assistant county engineer, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 14	1430	731	13.48	June 16	1730	1,110	14.61
Mar. 15	0930	1,060	14.24	June 17	0530	3,030	18.24
Apr. 27	2030	760	13.55	June 20	0330	573	13.46
May 4	1130	1,050	14.23	June 22	2015	1,300	14.92
May 12	1415	1,380	14.97	July 20	0445	*18,000	*28.19
May 16	0045	792	13.63	July 21	1730	853	14.12
May 25	0715	10,200	25.85	July 27	0215	704	13.79
June 7	1500	2,890	18.00	Aug. 19	0700	691	13.76

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.11	2.8	.01	.00	1.2	2.7	26	22	13	9.9	7.8	.45
2	.04	.86	.00	.00	.39	3.6	20	18	11	8.0	5.1	.39
3	.01	.37	.00	.08	.35	4.5	17		7.1	6.2	9.5	.37
4	.04	.23	.00	25	.31	3.3	16	583	4.7	4.1	6.9	.34
5	.35	.22	.00	8.0	.72	4.5	14	117	6.7	2.4	4.7	.27
6	.54	.20	.00	4.0	1.6	5.1	12	58	6.4	2.7	3.7	.17
7	.38	.11	.00	2.0	2.5	20	11	34	540	3.0	2.9	.17
8	.53	.10	.00	1.2	3.8	160	11	24	84	1.6	3.0	2.0
9	.83	.09	.00	7.4	3.5	90	11	143	28	4.4	2.8	.38
10	.75	.07	.00	34	1.9	128	11	48	16	133	48	.24
11	.89	.10	.00	15	1.8	291	10	-28	12	73	14	.17
12	.76	.14	.00	3.0	1.8	117	9.1	555	9.7	21	41	.17
13	.74	.20	.00	1.6	2.0	103	12	145	7.0	27	15	.15
14	.84	.12	.00	1.0	.87	325	18	58	105	14	7.5	.11
15	1.0	.09	.00	.60	.43	498	26	208	62	11	5.6	.09
16	1.0	.16	.00	33	.40	100	19	210	297	7.2	4.3	.07
17	1.3	.20	.00	92	.42	49	15	49	766	3.8	4.8	.07
18	1.4	.07	.00	24	.41	34	13	33	69	2.6	2.6	.15
19	1.1	.08	.00	4.7	.56	26	12	30	41	732	67	.19
20	.98	.20	.00	3.5	.80	24	28	24	127	3990	16	.22
21	1.2	.24	.00	3.9	2.0	23	24	20	32	288	7.9	.33
22	1.2	.24	.00	3.8	.47	20	17	18	418	100	5.8	.24
23	1.2	.15	.00	5.6	70	16	15	18	150	32	5.2	.12
24	1.2	.06	.00	4.6	36	16	12	18	41	21	3.8	.10
25	1.4	.15	.00	3.3	12	16	10	2590	29	17	2.9	.09
26	1.4	.26	.00	1.4	6.3	15	9.6	122	24	24	1.4	.07
27	1.6	.17	.00	1.7	5.3	13	356	51	19	98	.81	.59
28	6.7	.03	.00	.60	3.3	15	214	32	15	21	.63	.68
29	8.2	.00	.00	.71	--	38	49	22	13	20	.81	.15
30	4.4	.00	.00	1.1	--	35	29	16	11	11	1.9	.09
31	8.5	--	.00	.64	--	28	--	13	--	8.8	.60	--
TOTAL	50.59	7.71	0.01	287.43	207.66	2223.7	1046.7	5336	2964.6	5697.7	303.95	8.63
MEAN	1.63	.26	.000	9.27	7.42	71.7	34.9	172	98.8	184	9.80	.29
MAX	8.5	2.8	.01	92	70	498	356	2590	766	3990	67	2.0
MIN	.01	.00	.00	.00	.31	2.7	9.1	13	4.7	1.6	.60	.07
AC-FT	100	15	.02	570	412	4410	2080	10580	5880	11300	603	.17
CFSM	.03	.00	.00	.18	.14	1.37	.66	3.28	1.88	3.50	.19	.01
IN.	.04	.01	.00	.20	.15	1.58	.74	3.78	2.10	4.04	.22	.01

CAL YR 1989	TOTAL	2887.81	MEAN	7.91	MAX	2070	MIN	.00	AC-FT	5730	CFSM	.15	IN.	2.05
WTR YR 1990	TOTAL	18134.68	MEAN	49.7	MAX	3990	MIN	.00	AC-FT	35970	CFSM	.95	IN.	12.85

GRAND RIVER BASIN

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06897950 ELK CREEK NEAR DECATUR CITY, IA--Continued
(Hydrologic bench-mark station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1968 to current year.

REMARKS.--Miscellaneous biological data collected September 1970 to September 1972 are available in the Iowa City district office.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-	SPE-	BARO-	COLI-	STREP-						
		CHARGE, INST. CUBIC FEET PER SECOND (00061)	CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	(PER- CENT SATUR- ATION) (00301)	PRES- SURE (MM HG) (00025)	FORM- FECAL, OF (COLS./ 100 ML) (31625)	TOCOCCI FECAL, UM-MF (COLS. PER 100 ML) (31673)
NOV 02...	1630	0.76	630	7.4	7.0	5.0	1.4	9.0	76	741	1200	690
FEB 21...	1500	2.2	662	7.7	1.0	13.0	3.5	13.7	100	736	3	3300
MAY 23-23	1730	20	550	7.8	20.0	18.0	5.0	8.7	100	734	2800	1100
AUG 15...	1100	5.6	510	8.0	20.0	20.0	17	7.1	81	738	8500	6500
<hr/>												
DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (00915)	MAGNE- SIUM, DIS- SOLVED (00925)	SODIUM, DIS- SOLVED (00930)	SODIUM PERCENT (00932)	SODIUM AD- SORP- TION (00931)	POTAS- SIUM, DIS- SOLVED (00935)	ALKA- LINITY WAT DIS FIELD (39086)	CAR- BONATE WATER FIELD MG/L AS CO3 (00452)	BICAR- BONATE WATER FIELD MG/L AS HCO3 (00453)	SULFATE DIS- SOLVED (00945)	CHLO- RIDE, DIS- SOLVED (00940)
NOV 02...	300	89	19	E12	0	--	15	264	0	322	55	17
FEB 21...	--	100	20	13	--	--	5.2	237	0	289	110	12
MAY 23-23	260	78	15	8.7	7	0.2	3.2	179	0	218	7.2	7.3
AUG 15...	260	80	15	9.6	7	0.3	5.9	222	0	271	43	8.2
<hr/>												
DATE	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (00955)	SOLIDS, AT 180 DEG. C DIS- SOLVED (70300)	SOLIDS, CONSTITUENTS, DIS- SOLVED (70301)	SOLIDS, (TONS AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NO2+N03 ORGANIC DIS- SOLVED (00605)	NITRO- GEN, NITRITE DIS- SOLVED (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (00613)	NITRO- GEN, AMMONIA DIS- SOLVED (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	
NOV 02...	0.20	12	407	379	--	--	1.3	0.100	0.021	0.600	0.610	
FEB 21...	0.20	2.5	430	--	--	--	0.59	<0.100	0.030	0.110	0.110	
MAY 23-23	0.20	11	302	240	0.41	16.2	0.65	0.300	0.021	0.050	0.050	
AUG 15...	0.40	12	322	333	0.44	4.90	0.83	5.40	0.020	0.030	0.070	

GRAND RIVER BASIN

06897950 ELK CREEK NEAR DECATUR CITY, IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	NITRO-	PHOS-	PHORUS	PHOS-	PHORUS	SEDI-	SED.	SIEVE	ARSENIC	ALUM-	BARIUM,	BERYL-
	GEN, AM-	ORTHO,	PHORUS	PHOS-	PHORUS	MENT,	DIS-	DIAM.	DIS-	INUM,	DIS-	LUM,
	MONIA +	DIS-	DIS-	SOLVED	TOTAL	SUS-	CHARGE,	% FINER	SOLVED	DIS-	SOLVED	DIS-
	ORGANIC	TOTAL	(MG/L)	(MG/L)	(MG/L)	PENDED	(UG/L)	(T/DAY)	062 MM	(UG/L)	(UG/L)	(UG/L)
		(MG/L)	(AS P)	(AS P)	(AS P)	(80154)	(80155)	(70331)	(AS AS)	(01000)	(01106)	(01005)
		(00625)	(00671)	(00666)	(00665)							(01010)
NOV												
02...		1.9	0.171	0.260	0.340	46	0.09	92	2	<10	110	<0.5
FEB												
21...		0.70	0.020	0.030	0.070	63	0.37	27	<1	<10	110	<0.5
MAY												
23-23		0.70	0.021	0.030	0.070	--	--	--	1	<10	120	<0.5
AUG												
15...		0.90	0.150	0.180	0.260	54	0.82	95	2	<10	180	<0.5
DATE	CADMIUM	CHRO-	MIUM,	COBALT,	COPPER,	IRON,	LEAD,	LITHIUM	MANGA-	MERCURY	MOLYB-	NICKEL,
	DIS-	DIS-	DIS-	DIS-	DIS-	DIS-	DIS-	DIS-	NESE,	DIS-	DIS-	DIS-
	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED
	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	(AS CD)	(AS CR)	(AS CO)	(AS CU)	(AS FE)	(AS PB)	(01049)	(01130)	(AS LI)	(AS MN)	(AS HG)	(AS NI)
	(01025)	(01030)	(01035)	(01040)	(01046)							
NOV												
02...		1.0	<1	<3	2	55	<1	8	130	<0.1	<10	5
FEB												
21...		<1.0	<5	<3	<10	71	<10	6	990	0.1	<10	<10
MAY												
23-23		<1.0	<1	<3	3	15	<1	15	650	<0.1	<10	3
AUG												
15...		<1.0	<1	<3	2	9	<1	9	720	--	<10	3
DATE	SELE-	STRON-	VANA-	ZINC,	GROSS	GROSS	GROSS	GROSS	GROSS	GROSS	RADIUM	226,
	NIUM,	SILVER,	TIUM,	DIUIM,	SUSP.	BETA,	BETA,	BETA,	BETA,	BETA,	DIS-	DIS-
	DIS-	DIS-	DIS-	DIS-	TOTAL	DIS-	SOLVED	SOLVED	SOLVED	TOTAL	TOTAL	SOLVED,
	SOLVED	SOLVED	SOLVED	SOLVED	(UG/L)	(PC/L)	(PC/L)	(PC/L)	(PC/L)	(PC/L)	(PC/L)	RADON
	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(AS ZN)	(AS)	(AS SR/)	(AS SR/)	(AS SR/)	(AS SR/)	(AS SR/)	METHOD
	(AS SE)	(AS AG)	(AS SR)	(AS V)	(U-NAT)	(CS-137)	(YT-90)	(CS-137)	(YT-90)	(CS-137)	(YT-90)	(PC/L)
	(01145)	(01075)	(01080)	(01085)	(01090)	(80040)	(03515)	(80050)	(03516)	(80060)	(09511)	
NOV												
02...		<1	<1.0	310	<6	20	<0.4	18	15	1.4	1.4	0.10
FEB												
21...		1	<1.0	330	<6	3	--	--	--	--	--	--
MAY												
23-23		1	<1.0	240	<6	6	--	--	--	--	--	--
AUG												
15...		<1	<1.0	290	<6	15	--	--	--	--	--	--

GRAND RIVER BASIN

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06898000 THOMPSON RIVER AT DAVIS CITY, IA

LOCATION.--Lat 40°38'25", long 93°48'29", in SE1/4 SE1/4 sec.35, T.68 N., R.26 W., Decatur County, Hydrologic Unit 10280102, on right bank 15 ft downstream from bridge on U.S. Highway 69 at Davis City, 2.6 mi upstream from Dickersons Branch, and 5.2 mi upstream from Iowa-Missouri State line.

DRAINAGE AREA.--701 mi².

PERIOD OF RECORD.--May 1918 to July 1925, July 1941 to current year. Monthly discharge only for some periods, published in WSP 1310. Prior to October 1918, published as "Grand River".

REVISED RECORDS.--WSP 1240: 1918, 1920-21 (M), 1922-24, 1925 (M), 1946-47 (M). WSP 1440: Drainage area. WSP 1710: 1957.

GAGE.--Water-stage recorder. Datum of gage is 874.04 ft above NGVD. May 14, 1918, to July 2, 1925, July 14, 1941, to Feb. 24, 1942, nonrecording gage, and Feb. 25, 1942, to Feb. 8, 1967, water-stage recorder at same site at datum 2.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 4-19, 23-25, 28-30, Dec. 2, 3, 7, 8, 12, 14-16, 19-25, Jan. 7, 12-14, Jan. 19 to Feb. 5, and Feb. 15-21, 24-27. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--55 years (water years 1919-24, 1942-90), 374 ft³/s, 7.24 in/yr, 271,000 acre-ft/yr; median of yearly mean discharges, 340 ft³/s, 6.6 in/yr 246,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,300 ft³/s June 10, 1974, gage height, 19.43 ft, from rating curve extended above 17,000 ft³/s on basis of velocity-area study; minimum daily discharge, 0.1 ft³/s June 25, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Aug. 8, 1885, reached a stage of 22.8 ft, datum in use prior to Feb. 9, 1967, from floodmark, discharge, 30,000 ft³/s, from rating curve extended as explained above.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft³/s and maximum (*):

Date	Time	Discharge		Gage height		Date	Time	Discharge		Gage height	
		(ft ³ /s)	(ft)	(ft)	(ft)			(ft ³ /s)	(ft)	(ft)	(ft)
Mar. 15	1345	4,680	7.08			June 20	1330	5,000		7.32	
May 25	1600	13,600	11.70			July 20	1330	*13,800		*13.30	
June 18	1030	12,700	12.55								

Minimum daily discharge, 6.6 ft³/s Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	85	15	8.2	74	58	266	294	370	349	264	31
2	19	86	14	8.2	58	52	241	237	333	388	205	33
3	18	82	12	9.1	49	54	215	201	299	285	175	29
4	16	60	13	20	66	52	189	1000	266	245	186	33
5	16	46	15	28	70	54	167	1170	252	214	159	34
6	19	38	17	39	63	54	152	588	239	191	127	30
7	20	35	13	40	64	56	139	391	1230	304	110	26
8	20	34	10	37	67	702	129	295	714	262	97	48
9	18	28	13	30	76	2140	125	561	333	207	91	125
10	19	26	14	32	80	1370	124	488	259	1080	169	95
11	19	25	10	71	75	2410	124	330	229	1480	155	63
12	27	22	8.6	110	86	1860	124	1050	200	860	144	40
13	23	24	10	100	87	1220	124	1690	178	785	295	29
14	19	22	9.0	130	70	1530	137	788	1580	427	152	24
15	19	22	8.0	114	30	3940	201	658	2140	373	105	21
16	15	17	8.6	96	35	3060	197	1130	1390	304	89	18
17	17	14	9.3	286	38	1360	160	608	8320	246	82	16
18	15	13	9.3	145	48	754	136	403	11700	210	71	16
19	14	15	8.6	320	56	525	123	319	7300	206	457	16
20	14	17	8.4	240	48	402	136	279	3830	11200	257	17
21	16	17	7.5	170	40	350	188	250	1180	3620	171	25
22	48	17	6.6	150	66	320	179	228	1830	2050	115	23
23	37	14	7.1	110	120	283	158	216	1640	701	80	21
24	30	13	8.0	120	110	250	141	210	1010	434	66	19
25	24	16	9.0	110	64	223	123	7590	726	367	59	20
26	17	20	11	100	60	206	114	7620	717	505	53	21
27	15	20	11	130	90	195	927	1790	699	1470	48	22
28	18	14	9.9	140	86	184	1740	882	496	597	42	36
29	40	11	9.3	120	---	205	674	647	399	1380	38	32
30	52	12	8.8	100	---	294	400	513	355	983	37	21
31	65	---	8.2	110	---	295	---	427	---	395	36	---
TOTAL	729	865	322.2	3223.5	1876	24458	7853	32853	50214	32118	4135	984
MEAN	23.5	28.8	10.4	104	67.0	789	262	1060	1674	1036	133	32.8
MAX	65	86	17	320	120	3940	1740	7620	11700	11200	457	125
MIN	14	11	6.6	8.2	30	52	114	201	178	191	36	16
AC-FT	1450	1720	639	6390	3720	48510	15580	65160	99600	63710	8200	1950
CFSM	.03	.04	.01	.15	.10	1.13	.37	1.51	2.39	1.48	.19	.05
IN.	.04	.05	.02	.17	.10	1.30	.42	1.74	2.66	1.70	.22	.05
CAL YR 1989	TOTAL	21108.92	MEAN	57.8	MAX	4690	MIN	.41	AC-FT	41870	CFSM	.08
WTR YR 1990	TOTAL	159630.7	MEAN	437	MAX	11700	MIN	6.6	AC-FT	316600	CFSM	.62
									IN.	1.12		
										IN.	8.47	

GRAND RIVER BASIN

06898400 WELDON RIVER NEAR LEON, IA

LOCATION--Lat $40^{\circ}41'45''$, long $93^{\circ}38'07''$, in NE1/4 NE1/4 sec.17, T.68 N., R.24 W., Decatur County, Hydrologic Unit 10280102, on left bank 10 ft downstream from bridge on county highway A, 200 ft upstream from Unnamed Creek, 1.3 mi downstream from Brush Creek, and 6.5 mi southeast of post office at Leon.

DRAINAGE AREA.--104 mi².

PERIOD OF RECORD.--October 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 906.26 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 1 to Mar. 7 and Aug. 29 to Sept. 30. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--32 years, 68.8 ft³/s, 8.98 in/yr, 49,850 acre-ft/yr; median of yearly mean discharges, 61 ft³/s, 8.0 in/yr, 44,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 48,600 ft³/s Aug. 6, 1959, gage height, 25.27 ft, from rating curve extended above 5,600 ft³/s on basis of contracted-opening and flow-over-embankment measurement; no flow some years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Stage and discharge of the flood of Aug. 6, 1959 are the greatest since at least 1919.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 25	0730	6,720	17.96	July 20	0615	*7,350	*18.71

Minimum daily discharge, 0.09 ft³/s Oct. 25, 27, and Dec. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.27	1.0	.16	.45	4.8	2.5	26	56	30	35	10	4.5
2	.20	.70	.17	1.7	2.9	2.4	17	40	27	10	7.8	2.5
3	.21	.60	.14	3.3	3.1	2.3	12	34	24	6.9	7.2	8.0
4	.23	.52	.15	4.3	3.5	2.3	7.9	436	21	5.8	6.8	6.4
5	.21	.47	.16	3.5	3.8	2.2	6.5	228	23	5.1	5.9	5.0
6	.26	.43	.14	3.0	4.3	6.0	5.1	95	22	5.0	5.2	3.0
7	.35	.40	.13	2.5	5.0	12	4.5	40	278	4.8	4.6	2.0
8	.21	.36	.13	3.0	6.2	91	4.4	24	82	4.4	4.5	5.0
9	.16	.33	.15	3.5	6.0	75	4.7	301	31	238	4.3	4.5
10	.15	.31	.16	4.0	5.6	173	5.0	158	19	730	5.1	3.5
11	.14	.30	.15	5.0	5.3	430	4.0	43	15	468	27	3.0
12	.12	.27	.14	4.0	5.0	133	3.5	840	13	479	159	2.2
13	.11	.29	.16	3.1	4.5	394	7.0	339	11	154	227	2.0
14	.10	.27	.13	2.2	2.0	1230	16	101	739	30	17	1.7
15	.11	.25	.11	1.8	2.2	520	51	165	97	15	8.3	1.4
16	.11	.23	.10	2.4	2.5	165	20	413	540	8.9	8.3	2.2
17	.10	.19	.12	11.0	3.0	89	11	86	1870	6.3	5.5	3.2
18	.22	.17	.14	3.0	3.5	57	7.1	41	178	5.0	3.9	3.7
19	.21	.20	.12	4.0	3.2	40	6.7	34	84	85	86	2.0
20	.15	.20	.11	5.4	2.0	32	13	26	583	4100	95	1.3
21	.10	.25	.10	4.3	3.0	29	15	18	70	827	19	3.5
22	.11	.28	.09	3.1	4.0	24	9.0	17	718	598	11.0	3.2
23	.10	.22	.10	3.4	4.5	20	6.9	17	128	112	8.0	1.0
24	.11	.17	.15	3.6	5.2	17	5.7	18	41	64	6.9	.90
25	.09	.19	.45	3.4	4.5	17	4.6	3500	23	69	6.5	1.0
26	.14	.21	.70	3.3	3.5	16	4.1	330	18	62	6.1	1.4
27	.09	.25	.47	3.6	2.8	14	1290	105	13	273	5.8	1.8
28	.20	.23	.43	3.4	2.6	16	1390	64	10	48	5.5	3.0
29	.60	.13	.39	3.2	---	40	186	47	8.5	83	5.4	2.6
30	2.0	.15	.35	4.2	---	55	87	37	16	26	4.5	2.3
31	1.7	---	.32	4.0	---	35	---	32	---	14	8.0	---
TOTAL	8.86	9.57	6.32	110.65	108.5	3741.7	3230.7	7685	5732.5	8572.2	785.1	87.80
MEAN	.29	.32	.20	3.57	3.87	121	108	248	191	277	25.3	2.93
MAX	2.0	1.0	.70	11	6.2	1230	1390	3500	1870	4100	227	8.0
MIN	.09	.13	.09	.45	2.0	2.2	3.5	17	8.5	4.4	3.9	.90
AC-FT	18	19	13	219	215	7420	6410	15240	11370	17000	1560	174
CFSM	.00	.00	.00	.03	.04	1.16	1.04	2.38	1.84	2.66	.24	.03
IN.	.00	.00	.00	.04	.04	1.34	1.16	2.75	2.05	3.07	.28	.03

CAL YR 1989 TOTAL 5520.97 MEAN 15.1 MAX 2990 MIN .00 AC-FT 10950 CFSM .15 IN. 1.97
WTR YR 1990 TOTAL 30078.90 MEAN 82.4 MAX 4100 MIN .09 AC-FT 59660 CFSM .79 IN. 10.76

CHARITON RIVER BASIN

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06903400 CHARITON RIVER NEAR CHARITON, IA

LOCATION.--Lat 40°57'12", long 93°15'37", in SW1/4 NE1/4 sec.15, T.71 N., R.21 W., Lucas County, Hydrologic Unit 10280201, on right bank 15 ft downstream from bridge on county highway S43, 0.4 mi downstream from Wolf Creek and 5.0 mi southeast of Chariton.

DRAINAGE AREA.--182 mi².

PERIOD OF RECORD.--October 1965 to current year. Occasional low-flow measurements, water years 1958-60, 1962, 1964.

GAGE.--Water-stage recorder. Datum of gage is 917.90 ft above NGVD (U.S. Army Corps of Engineers' bench mark).

REMARKS.--Estimated daily discharges: Jan. 3-27, and Jan. 31 to Mar. 6. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--24 years, 114 ft³/s, 8.51 in/yr, 82,390 acre-ft/yr; median of yearly mean discharges, 98.0 ft³/s, 7.3 in/yr, 71,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,600 ft³/s July 4, 1981, gage height, 23.14 ft; no flow at times during some years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1960 reached a stage of about 23 ft, discharge, about 15,000 ft³/s and flood of June 5, 1947 reached a stage of 21.65 ft, from floodmark, discharge, 11,000 ft³/s. A discharge of 0.08 ft³/s was measured on Oct. 30, 1963.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 28	1530	1,890	16.35	June 17	2230	2,120	16.75
May 5	0400	1,890	16.35	July 22	0730	3,080	17.84
May 25	2130	*3,730	*18.31				

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.10	.00	.00	.00	2.0	2.4	37	172	34	18	40	4.3
2	.07	.03	.00	.00	1.9	1.9	29	70	26	86	26	3.1
3	.00	.02	.00	.04	2.1	1.4	22	50	20	37	19	2.5
4	.00	.04	.00	.07	2.0	1.6	19	674	15	16	57	2.2
5	.00	.00	.00	.14	2.2	1.8	16	1410	13	9.5	40	2.1
6	.00	.01	.00	.23	2.1	2.1	13	615	13	6.6	16	2.0
7	.00	.00	.00	.57	1.9	2.2	11	146	14	5.0	10	1.8
8	.00	.00	.00	.46	2.4	7.6	9.5	73	15	3.9	7.4	11
9	.00	.00	.00	.54	2.6	22	9.0	75	16	3.6	5.7	30
10	.00	.00	.00	.63	2.9	42	9.3	136	15	16	5.3	36
11	.00	.00	.00	.77	2.8	149	8.8	105	17	73	5.9	16
12	.00	.00	.00	.90	3.0	253	7.7	483	13	419	28	6.6
13	.00	.00	.00	1.1	3.3	210	8.6	1030	9.7	694	233	3.8
14	.00	.00	.00	1.3	3.0	494	17	503	28	562	370	2.4
15	.00	.00	.00	1.0	2.8	1190	18	138	95	138	107	1.7
16	.00	.00	.00	.95	2.7	732	18	590	180	45	36	1.5
17	.00	.00	.00	1.0	2.5	404	17	465	1620	27	22	1.2
18	.00	.00	.00	.94	2.3	109	15	126	1500	18	15	1.1
19	.00	.00	.00	1.2	2.2	66	13	58	1200	41	12	1.0
20	.00	.00	.00	3.0	2.0	49	15	44	900	1720	15	.92
21	.00	.00	.00	2.5	1.9	43	17	37	183	2240	50	1.2
22	.00	.00	.00	2.1	1.8	41	17	31	413	2710	39	1.4
23	.00	.00	.00	1.7	2.7	34	17	31	383	1810	21	.89
24	.00	.00	.00	2.1	4.3	28	15	34	214	1630	12	.76
25	.00	.00	.00	2.5	6.0	24	13	2180	70	317	8.3	.78
26	.00	.00	.00	3.0	4.9	21	11	2410	39	105	6.4	.72
27	.00	.00	.00	3.7	3.8	20	101	2200	28	123	4.9	.68
28	.00	.00	.00	4.8	3.0	18	1500	1380	28	148	3.7	.62
29	.00	.00	.00	4.2	--	26	843	185	26	564	3.0	.55
30	.00	.00	.00	3.0	--	39	744	74	18	171	3.4	.51
31	.00	--	.00	2.5	--	43	--	47	--	83	11	--
TOTAL	0.17	0.10	0.00	46.94	77.1	4078.0	3590.9	15572	7145.7	13839.6	1233.0	139.33
MEAN	.005	.003	.000	1.51	2.75	132	120	502	238	446	39.8	4.64
MAX	.10	.04	.00	4.8	6.0	1190	1500	2410	1620	2710	370	36
MIN	.00	.00	.00	.00	1.8	1.4	7.7	31	9.7	3.6	3.0	.51
AC-FT	.3	.2	.00	93	153	8090	7120	30890	14170	27450	2450	276
CFSM	.00	.00	.00	.01	.02	.72	.66	2.76	1.31	2.45	.22	.03
IN.	.00	.00	.00	.01	.02	.83	.73	3.18	1.46	2.83	.25	.03

CAL YR 1989	TOTAL 3530.80	MEAN 9.67	MAX 904	MIN .00	AC-FT 7000	CFSM .05	IN. .72
WTR YR 1990	TOTAL 45722.84	MEAN 125	MAX 2710	MIN .00	AC-FT 90690	CFSM .69	IN. 9.35

CHARITON RIVER BASIN

06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IA

LOCATION.--Lat 40°48'02", long 93°11'32", in SW1/4 SW1/4 sec.5, T.69 N. R.20 W., Wayne County, Hydrologic Unit 10280201, on right bank 20 ft downstream from bridge on county highway S50, 1.3 mi downstream from Jordan Creek and 4.3 mi northwest of Promise City.

DRAINAGE AREA.--168 mi².

PERIOD OF RECORD.--October 1967 to current year. Occasional low-flow measurements, water years 1958-66, published as "near Bethlehem". Monthly discharge measurements for March 1965 to September 1967 available in files of Iowa City district office.

GAGE.--Water-stage recorder. Datum of gage is 913.70 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Oct. 4, Oct. 8 to Mar. 7, July 29-31, and Aug. 31 to Sept. 6. Records fair except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--23 years, 112 ft³/s, 9.05 in/yr, 81,140 acre-ft/yr; median of yearly mean discharges, 110 ft³/s, 8.9 in/yr, 79,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,000 ft³/s July 4, 1981, gage height, 29.95 ft; no flow at times some years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Sept. 21, 1965, reached a stage of 25.5 ft, from floodmarks, discharge, about 18,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 14	2245	2,100	13.97	June 20	1600	2,700	15.84
Apr. 28	0700	2,800	16.06	June 22	1100	2,590	15.51
May 4	2000	2,940	16.34	July 20	1445	5,130	19.06
May 25	1630	5,720	19.51	July 21	2015	2,110	14.00
June 17	1300	*6,890	*20.39	July 29	0600	2,970	16.42

Minimum daily discharge, 0.05 ft³/s, Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.33	.52	.20	6.0	4.9	3.3	30	62	26	23	31	5.8
2	.50	.45	.25	5.2	4.7	3.0	23	43	23	21	28	4.0
3	.38	.41	.20	4.8	4.6	3.2	18	34	18	19	27	6.0
4	.30	.39	.18	6.0	4.4	3.0	14	1220	15	17	30	8.0
5	.32	.37	.20	6.6	5.4	5.8	10	1110	14	14	28	11
6	.64	.36	.17	5.8	6.0	9.4	9.2	211	13	13	25	15
7	.21	.35	.15	4.9	5.8	15	7.2	105	18	13	23	21
8	.24	.37	.13	5.4	7.0	19	7.0	63	155	13	19	28
9	.23	.43	.14	6.2	9.2	43	7.1	263	45	31	17	33
10	.21	.49	.13	7.0	8.2	49	8.2	205	21	204	16	30
11	.20	.58	.11	8.0	9.0	356	7.6	78	13	211	17	28
12	.19	.50	.10	9.0	13	139	6.0	444	10	303	123	28
13	.18	.39	.10	7.4	11	134	6.8	349	13	379	202	27
14	.17	.43	.09	6.2	7.8	837	25	112	597	85	44	26
15	.18	.46	.09	4.8	5.6	1380	39	86	152	45	25	24
16	.19	.41	.08	5.6	4.0	237	72	164	1650	26	18	24
17	.18	.36	.08	6.8	3.5	103	33	66	5410	13	16	25
18	.20	.32	.08	8.0	4.3	64	24	36	543	12	14	30
19	.30	.31	.07	9.4	5.4	42	19	27	144	18	14	33
20	.23	.29	.07	8.0	3.5	32	24	22	2110	3550	108	35
21	.17	.33	.06	7.0	5.0	30	29	17	481	1500	62	45
22	.19	.41	.06	6.2	7.4	27	23	15	1810	597	20	49
23	.18	.34	.05	5.8	11	21	18	15	371	256	15	43
24	.17	.30	.09	5.6	16	17	14	18	119	516	11	40
25	.16	.33	.16	6.4	7.6	16	11	3420	68	149	8.0	35
26	.22	.58	.35	6.8	3.7	15	10	1240	50	239	5.6	35
27	.17	.49	.60	6.4	4.8	12	207	159	39	689	4.5	34
28	.27	.38	1.1	6.0	4.3	12	1990	92	30	579	3.9	39
29	.38	.28	2.0	5.6	--	33	256	65	25	2000	5.8	45
30	.50	.19	4.0	5.2	--	54	109	42	22	150	11	48
31	.66	--	7.2	5.0	--	36	--	30	--	60	8.0	--
TOTAL	8.45	11.82	18.29	197.1	187.1	3750.7	3057.1	9813	14005	11745	979.8	854.8
MEAN	.27	.39	.59	6.36	6.68	121	102	317	467	379	31.6	28.5
MAX	.66	.58	7.2	9.4	16	1380	1990	3420	5410	3550	202	49
MIN	.16	.19	.05	4.8	3.5	3.0	6.0	15	10	12	3.9	4.0
AC-FT	.17	.23	.36	391	371	7440	6060	19460	27780	23300	1940	1700
CFSM	.00	.00	.00	.04	.04	.72	.61	1.88	2.78	2.26	.19	.17
IN.	.00	.00	.00	.04	.04	.83	.68	2.17	3.10	2.60	.22	.19

CAL YR 1989	TOTAL	3910.46	MEAN	10.7	MAX	1310	MIN	.00	AC-FT	7760	CFSM	.06	IN.	.87
WTR YR 1990	TOTAL	44628.16	MEAN	122	MAX	5410	MIN	.05	AC-FT	88520	CFSM	.73	IN.	9.88

06903880 RATHBUN LAKE NEAR RATHBUN, IA

LOCATION.--Lat 40°49'30", long 92°53'33", in NW1/4 NE1/4 sec.35, T.70 N., R.18 W., Appanoose County, Hydrologic Unit 10280201, at control tower of Rathbun Dam, 1.8 mi north of Rathbun and 3.9 mi upstream from Walnut Creek and at mile 142.3.

DRAINAGE AREA.--549 mi².

PERIOD OF RECORD.--October 1969 to current year.

GAGE.--Water-stage recorder. Datum of gage is at NGVD.

REMARKS.--Reservoir is formed by earthfill dam completed in 1969. Storage began in November 1969. Release is controlled by two hydraulically controlled slide gates, 6 ft wide and 12 ft high, into forechamber of an 11-ft diameter horseshoe conduit through the dam. No dead storage. Maximum design discharge through gates is 5,000 ft³/s. Uncontrolled notch spillway is concrete overflow section 500 ft in length, located about 3,000 ft west of the right abutment of the dam and provides emergency discharge into the adjacent drainage area of Little Walnut Creek. Uncontrolled notch spillway is at elevation 926 ft, contents 545,621 acre-ft, surface area, 20,974 acres. Conservation pool level is at elevation 904.0 ft, contents 199,830 acre-ft, surface area, 10,989 acres. Reservoir is used for flood control, low-flow augmentation, conservation and recreation.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 514,000 acre-ft July 22, 23, 1982; maximum elevation, 924.46 ft July 22, 1982; minimum daily contents, 100 acre-ft Oct. 1-15, Nov. 17-21, 1969; minimum elevation, 855.40 ft Oct. 6-10, 1969.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 363,000 acre-ft July 30; maximum elevation 916.11 ft July 30; minimum daily contents, 156,000 acre-ft Dec. 18 to Jan. 3; minimum elevation, 899.69 ft Jan. 2.

Capacity table (elevation, in feet, and contents, in acre-feet)

860	150	880	31,900	905	211,000
862	226	885	52,700	910	272,600
865	950	890	80,300	915	345,000
870	5,870	895	115,600	920	428,900
875	17,000	900	158,800	925	524,900

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
OBSERVATION AT 08:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	165000	162000	158000	156000	157000	158000	181000	198000	261000	322000	360000	306000
2	165000	162000	158000	156000	158000	158000	182000	198000	260000	320000	342000	304000
3	164000	161000	158000	156000	158000	158000	181000	199000	259000	319000	355000	302000
4	164000	161000	157000	157000	158000	158000	181000	201000	258000	317000	357000	300000
5	164000	161000	157000	157000	158000	158000	182000	207000	256000	316000	357000	298000
6	164000	161000	157000	157000	158000	158000	181000	213000	256000	316000	355000	296000
7	164000	161000	157000	157000	158000	158000	181000	217000	254000	314000	353000	294000
8	164000	161000	157000	157000	158000	159000	181000	217000	255000	312000	350000	293000
9	163000	160000	157000	157000	158000	159000	181000	217000	255000	310000	347000	292000
10	164000	160000	157000	157000	158000	159000	181000	219000	255000	311000	345000	290000
11	163000	160000	157000	157000	158000	160000	181000	218000	255000	311000	343000	288000
12	163000	160000	157000	157000	158000	161000	181000	219000	253000	310000	342000	287000
13	163000	160000	157000	157000	158000	163000	181000	221000	253000	312000	342000	285000
14	163000	160000	157000	157000	157000	164000	181000	224000	255000	313000	341000	283000
15	163000	160000	157000	157000	158000	169000	181000	225000	256000	313000	339000	281000
16	163000	160000	157000	157000	158000	174000	181000	227000	257000	312000	337000	279000
17	163000	160000	157000	157000	158000	178000	182000	228000	279000	309000	335000	276000
18	163000	159000	156000	157000	157000	179000	181000	228000	294000	308000	333000	274000
19	163000	159000	156000	157000	158000	180000	181000	228000	301000	307000	330000	273000
20	162000	159000	156000	157000	158000	180000	182000	228000	307000	313000	329000	271000
21	162000	159000	156000	157000	158000	180000	182000	228000	314000	324000	330000	270000
22	162000	159000	156000	157000	158000	181000	182000	227000	319000	341000	329000	270000
23	162000	159000	156000	157000	158000	181000	182000	226000	325000	350000	327000	269000
24	162000	158000	156000	157000	159000	181000	182000	225000	327000	354000	324000	268000
25	162000	158000	156000	158000	158000	181000	182000	230000	328000	356000	322000	268000
26	161000	158000	156000	158000	158000	181000	182000	242000	328000	355000	320000	266000
27	161000	158000	156000	158000	158000	180000	183000	253000	328000	357000	317000	265000
28	161000	158000	156000	158000	158000	180000	186000	259000	326000	358000	315000	263000
29	161000	158000	156000	158000	---	181000	191000	262000	323000	360000	312000	261000
30	162000	158000	156000	158000	---	181000	196000	262000	323000	363000	311000	259000
31	162000	---	156000	157000	---	181000	---	261000	---	362000	308000	---
MEAN	163000	160000	157000	157000	158000	170000	182000	226000	284000	327000	336000	281000
MAX	165000	162000	158000	158000	159000	181000	196000	262000	328000	363000	360000	306000
MIN	161000	158000	156000	156000	157000	158000	181000	198000	253000	307000	308000	259000

CAL YR 1989 MEAN 163000 MAX 168000 MIN 156000
WTR YR 1990 MEAN 217000 MAX 363000 MIN 156000

CHARITON RIVER BASIN

06903900 CHARITON RIVER NEAR RATHBUN, IA

LOCATION.--Lat. 40°49'22", long. 92°53'22", in SE1/4 NE1/4 sec.35, T.70 N., R.18 W., Appanoose County, Hydrologic Unit 10280201, on left bank 600 ft downstream from outlet of Rathbun Dam, 1.8 mi north of Rathbun and 3.7 mi upstream from Walnut Creek and at mile 142.1.

DRAINAGE AREA.--549 mi².

PERIOD OF RECORD.--October 1956 to current year. Monthly discharge only for some periods, published in WSP 1730.

REVISED RECORDS.--WSP 1560: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 847.92 ft above NGVD. Prior to Nov. 16, 1960, nonrecording gage and Nov. 17, 1960, to Sept. 30, 1969, recording gage, at site 3.1 mi downstream at datum 4.65 ft lower.

REMARKS.--Estimated daily discharges: Mar. 14-16, Apr. 27, 28, May 4, 5, 25, 26, June 14 to July 1, July 17-22, Aug. 23, Sept. 3-9, and Sept. 18-20. Records fair. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers gage-height telemeter at station. Flow regulated by Rathbun Reservoir (station 06903880) since Nov. 21, 1969. Records of discharge include diversion of:

Date	Discharge (ft ³ /s)	Date	Discharge (ft ³ /s)
Oct. 1 - 20	11	Apr. 24 to May 4, May 7	9
Oct. 21 to Mar. 23	9	May 5, 6, May 8 to Sept. 30	10
Mar. 24 to Apr. 23	8		

The diversion goes from the reservoir through fish ponds on left bank downstream from dam. Diverted flow returns to stream 0.1 mi downstream from gage. Rathbun Regional Water Association permit No. 3663 allows withdrawal from Rathbun Dam discharge immediately downstream from gage for maximum rate of 4,200 gpm (9.36 ft³/s) and maximum quantity of 638 million gallons per year (1,955 acre-ft).

AVERAGE DISCHARGE.--34 years, 333 ft³/s, 8.24 in/yr, (unadjusted) 241,300 acre-ft/yr; median of yearly mean discharges, 260 ft³/s, 6.4 in/yr, 188,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,800 ft³/s Mar. 31, 1960, gage height, 25.3 ft from flood-mark, site and datum then in use; no flow Oct. 26, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,210 ft³/s Aug. 17, gage height, 10.73 ft; minimum daily discharge, 17 ft³/s Sept. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	20	19	18	21	22	21	22	521	510	1090	944
2	22	20	19	19	21	22	21	22	521	815	1120	800
3	22	20	18	19	21	22	21	22	520	870	1090	810
4	22	20	18	19	21	22	21	22	521	869	95	810
5	22	20	18	19	21	22	21	23	520	976	520	810
6	22	20	18	19	21	22	21	22	518	1070	1030	810
7	22	20	18	19	21	22	21	154	351	1070	1090	810
8	22	20	18	19	21	23	21	295	21	1070	1150	810
9	22	20	18	19	21	23	21	297	21	985	1160	580
10	22	19	18	19	21	23	21	299	21	139	1170	789
11	22	19	18	19	21	23	21	300	332	401	911	787
12	22	20	18	20	21	23	21	302	567	545	705	791
13	22	20	18	20	21	23	21	303	598	699	826	800
14	22	19	18	20	21	23	21	303	350	551	1040	806
15	22	19	18	20	22	23	21	304	21	758	1140	810
16	22	19	18	20	22	22	21	305	21	1010	1140	806
17	22	19	18	20	22	22	21	305	21	1000	1170	798
18	22	19	18	20	22	22	21	304	21	1010	1190	810
19	21	19	18	20	22	22	21	305	21	670	1150	810
20	22	19	18	20	22	22	20	305	21	860	519	810
21	20	19	18	20	22	22	21	388	21	21	615	524
22	20	19	18	20	22	22	21	547	21	21	865	17
23	20	19	18	20	22	22	21	547	21	366	1090	17
24	20	19	18	20	22	22	21	545	21	768	1140	18
25	20	19	18	20	22	21	22	520	21	902	1150	450
26	20	19	18	20	22	21	22	21	410	910	1150	806
27	20	19	18	20	22	21	22	510	216	1150	806	
28	20	19	19	21	22	21	22	324	510	528	1150	809
29	20	19	19	21	22	21	22	520	510	520	1140	807
30	20	19	18	21	22	21	22	519	510	779	1140	807
31	20	---	18	21	---	21	---	520	---	1040	1140	---
TOTAL	659	581	562	612	602	682	636	8188	8063	21949	31036	21062
MEAN	21.3	19.4	18.1	19.7	21.5	22.0	21.2	264	269	708	1001	702
MAX	22	20	19	21	22	23	22	547	598	1070	1190	944
MIN	20	19	18	18	21	21	20	21	21	21	95	17
AC-FT	1310	1150	1110	1210	1190	1350	1260	16240	15990	43540	61560	41780

CAL YR 1989 TOTAL 7599 MEAN 20.8 MAX 46 MIN 18 AC-FT 15070
WTR YR 1990 TOTAL 94632 MEAN 259 MAX 1190 MIN 17 AC-FT 187700

CHARITON RIVER BASIN

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06904010 CHARITON RIVER NEAR MOULTON, IA

LOCATION.--Lat $40^{\circ}41'30''$, long $92^{\circ}46'15''$, in SE1/4 NE1/4 sec.14, T.68N., R.17W., Appanoose County, Hydrologic Unit 10280201, on right bank 6 ft downstream from bridge on county highway J45, 0.7 mi downstream from Hickory Creek, 5.0 mi west of Moulton, 8.0 mi upstream from Iowa-Missouri border, 20.8 mi downstream from Rathbun Dam, and at mile 121.5.

DRAINAGE AREA.--740 mi².

PERIOD OF RECORD--August 1979 to current year.

GAGE--Water stage recorder. Datum of gage is 800.00 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Nov. 18, 24, Nov. 29 to Dec. 4, Dec. 7 to Jan. 15, Jan. 17-22, 25-29, 31, Feb. 2-4, 14-21, 24-28. Records good except those for estimated daily discharges, which are poor. Flow regulated by Rathbun Reservoir (station 06903880) 20.8 mi upstream. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--11 years, 538 ft³/s, 9.87 in/yr, 389,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,200 ft³/s July 16, 1982, gage height, 36.83 ft; minimum daily discharge, 14 ft³/s June 22-23, 27, and July 9, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of about 45 ft, discharge unknown, from information by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,540 ft³/s May 25, gage height, 32.33 ft; minimum daily discharge, 15 ft³/s Dec. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	31	26	21	37	51	64	122	555	513	1110	1170
2	25	25	27	21	37	47	57	93	552	521	1160	865
3	25	25	27	30	36	46	51	80	547	707	1150	850
4	26	24	26	28	38	44	48	999	543	716	1060	846
5	28	24	24	25	39	43	44	1870	541	720	273	842
6	34	23	22	23	43	44	41	625	542	822	992	839
7	28	24	21	25	65	44	40	245	590	829	1060	851
8	26	24	20	28	87	60	39	324	368	828	1170	844
9	26	25	19	35	74	146	37	353	132	832	1170	607
10	25	24	20	43	58	175	38	410	98	594	1210	819
11	26	24	19	40	48	459	37	362	80	400	1170	833
12	25	24	19	38	43	535	36	381	485	518	788	831
13	27	25	18	35	39	271	37	492	532	530	835	833
14	26	24	17	40	38	637	47	407	1170	635	989	836
15	24	23	17	45	37	1690	52	353	560	531	1170	827
16	26	23	17	49	35	797	58	398	427	766	1180	818
17	31	23	18	47	34	254	64	366	2990	826	1190	815
18	31	24	20	45	37	149	53	319	1450	829	1240	817
19	30	26	21	40	36	112	48	303	474	612	1240	810
20	29	25	20	35	39	94	46	294	2920	2930	713	803
21	30	23	19	36	41	85	45	288	3230	2300	1080	799
22	31	24	16	39	81	88	44	468	1330	2260	847	232
23	32	24	15	40	366	71	43	526	854	448	1170	61
24	30	25	16	40	130	60	41	528	281	794	1190	54
25	30	26	17	39	50	58	38	3190	143	843	1230	85
26	31	26	19	37	45	55	37	3100	470	1040	1220	759
27	32	27	18	36	48	53	81	808	537	1380	1210	796
28	32	26	19	38	47	52	1050	254	549	1130	1210	801
29	32	25	22	38	---	57	610	584	561	1200	1210	794
30	37	25	23	40	---	63	210	575	520	728	1220	792
31	41	---	22	37	---	64	---	561	---	1080	1220	---
TOTAL	901	741	624	1113	1708	6404	3136	19678	24031	28862	33677	21929
MEAN	29.1	24.7	20.1	35.9	61.0	207	105	635	801	931	1086	731
MAX	41	31	27	49	366	1690	1050	3190	3230	2930	1240	1170
MIN	24	23	15	21	34	43	36	80	80	400	273	54
AC-FT	1790	1470	1240	2210	3390	12700	6220	39030	47670	57250	66800	43500

CAL YR 1989 TOTAL 16068 MEAN 44.0 MAX 2190 MIN 15 AC-FT 31870
WTR YR 1990 TOTAL 142804 MEAN 391 MAX 3230 MIN 15 AC-FT 283300

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Crest-stage partial-record stations

The following table contains annual maximum discharge for crest-stage stations. A crest-stage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained, but is not published herein. The years given in the period of record represent water years up to the current year for which the annual maximum has been determined.

Annual maximum discharge at crest-stage partial-record stations during water year 1990

Station no.	Station name	Location	Drainage area (mi ²)	Period of record	Date	Gage height (feet)	Annual maximum Discharge (ft ³ /s)
Upper Iowa River Basin							
05387490	Dry Run Creek near Decorah, Ia.	Lat 43°17'29", long 91°48'33", in SE1/4 sec.20, T.98N., R.8 W., Winneshiek County, on State Highway 9, 0.5 mi west of Decorah.	21.0	1978-	08-25-90	18.49	1,940
05387500	Upper Iowa River at Decorah, Ia. (discontinued)	Lat 43°18'19", long 91°47'48", in NE1/4 sec.16, T.98N., R.8 W., Winneshiek County, on right bank 1,200 ft upstream from bridge on U.S. Highway 52 (city route) in Decorah.	511	1951-	1990	(+)	(+)
05388310	Waterloo Creek near Dorchester, Ia.	Lat 43°27'04", long 91°30'18", in NW1/4 sec.25, T.100 N., R.6 W., Allamakee County, on State Highway 76, 1.4 mi south of Dorchester.	43.6	1966-	03-08-90 06-29-90	699.30(b) 699.12	(+)
Wexford Creek Basin							
05388400	Wexford Creek near Harpers Ferry, Ia. (discontinued)	Lat 43°16'22", long 91°08'00", in SE1/4 sec.25, T.98 N., R.3 W., Allamakee County, at bridge, 5 mi north of Harpers Ferry on county highway X52.	11.9	1953-	1990	(+)	(+)
Turkey River Basin							
05411530	North Branch Turkey River near Cresco, Ia.	Lat 43°22'15", long 92°12'49", in NW1/4 sec.25, T.99 N., R.12.W., Howard County, at bridge on State Highway 9, 5 mi west of Cresco.	19.5	1966-	08-25-90	93.88	11,500
05411700	Crane Creek near Lourdes, Ia. (discontinued)	Lat 43°14'57", long 92°18'32", in SE1/4 NW1/4 sec.6, T.97 N., R.12 W., Howard County, at bridge on State Highway 272, 1 mi southwest of Lourdes.	75.8	1951-	08-25-90	13.55	7,400
Little Maquoketa River Basin							
05414350	Little Maquoketa River near Graf, Ia.	Lat 42°30'09", long 90°51'50", in SE1/4 sec.20, T.89 N., R.1 E., Dubuque County, at bridge on county highway, 300 ft downstream from Illinois Central railroad bridge, 0.5 mi northeast of Graf.	39.6	1951-	08-17-90	12.32	4,090
05414400	Middle Fork Little Maquoketa River near Rickardsville, Ia.	Lat 42°33'38", long 90°51'35", in SE1/4 sec.32, T.90 N., R.1 E., Dubuque County, at bridge on county highway, 2 mi southeast of Rickardsville.	30.2	1951-	08-25-90	15.31(d)	752
05414450	North Fork Little Maquoketa River near Rickardsville, Ia.	Lat 42°35'09", long 90°51'20", near NW corner sec.28, T.90 N., R.1 E., Dubuque County, at bridge on county highway, 1 mi northeast of Rickardsville.	21.6	1951-	03-08-90	6.03(b)	(+)
05414500	Little Maquoketa River near Durango, Ia.	Lat 42°33'18", long 90°44'46", in NW1/4 NE1/4 sec.5, T.89 N., R.2 E., Dubuque County, on left bank 10 ft upstream from bridge on county highway, 300 ft upstream from Cloie Branch, 1.7 mi east of Durango, 5.6 mi northwest of court house at Dubuque and 6.4 mi upstream from mouth.	130	1934-	1990	(+)	(+)
05414600	Little Maquoketa River tributary at Dubuque, Ia.	Lat 42°32'33", long 90°41'38", near NW corner sec.11, T.89 N., R.2 E., Dubuque County at bridge on State Highway 386, near north city limits of Dubuque.	1.54	1951-	08-25-90	12.85	454

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Station no.	Station name	Location	Drainage area (mi ²)	Period of record	Date	Gage height (feet)	Annual maximum discharge (ft ³ /s)
Maquoketa River Basin							
05417530	Plum Creek at Earlville, Ia.	Lat 42°28'13", long 91°14'53", in NE1/4 sec.1, T.88 N., R.4 W., Delaware County, at bridge on U.S. Highway 20, 1.5 mi southeast of Earlville.	41.1	1966-	08-25-90	84.08	970
05417590	Kitty Creek near Langworthy, Ia.	Lat 42°12'04", long 91°12'27", in NW1/4 sec.4, T.85 N., R.3 W., Jones County, at bridge on U.S. Highway 151, 1 mi northeast of Langworthy.	14.4	1966-	08-25-90	87.62	1,360
05418645	Williams Creek near Charlotte, Ia.	Lat 41°55'55", long 90°31'44", in SE1/4 sec.6, T.82 N., R.4 E., Clinton County, at culvert on county road Y70, 5 mi southwest of Charlotte, 2.1 mi north of county highway E63.		1990-	08-19-90	(+)	(+)
Wapsipinicon River Basin							
05420600	Little Wapsipinicon River tributary near Riceville, Ia.	Lat 43°21'31", long 92°29'08", near S1/4 corner sec.27, T.99 N., R.14 W., Howard County, at culvert on county highway, 3.5 mi east of Riceville.	0.90	1953-	08-25-90	5.64	(+)
05420620	Little Wapsipinicon River near Acme, Ia.	Lat 43°19'37", long 92°29'07", near N1/4 corner sec.10, T.98 N., R.14 W., Howard County, at bridge on county highway, 1 mi north of Acme.	7.76	1953-	08-25-90	7.60	978
05420640	Little Wapsipinicon River at Elma, Ia.	Lat 43°14'30", long 92°27'04", in NW1/4 sec.12, T.97 N., R.14 W., Howard County, at bridge on county highway B17, near west city limits of Elma.	37.3	1953-	08-25-90	11.71	3,860
05420650	Little Wapsipinicon River near New Hampton, Ia.	Lat 43°03'58", long 92°23'38", in NW1/4 sec.9, T.95 N., R.13 W., Chickasaw County, at bridge on U.S. Highway 18, 4 mi west of New Hampton.	95.0	1966-	08-25-90	89.69	14,900
05420690	East Fork Wapsipinicon River near New Hampton, Ia.	Lat 43°05'11", long 92°18'22", in SE1/4 sec.31, T.96 N., R.12 W., Chickasaw County, at bridge on U.S. Highway 63, 2 mi north of New Hampton.	30.3	1966-	08-25-90	89.50	10,800
05420850	Little Wapsipinicon River near Oran, Ia.	Lat 42°42'53", long 92°02'29", near NW corner sec.9, T.91 N., R.10 W., Fayette County, at bridge on State Highway 3, 2 mi northeast of Oran.	94.1	1966-	08-25-90	91.78	(+)
05420855	Buck Creek near Oran, Ia.	Lat 42°42'53", long 92°07'33", in NE1/4 sec.10, T.91 N., R.11 W., Bremer County, at bridge on State Highway 3, 2.5 mi northwest of Oran.	37.9	1966-	07-29-90	90.06	1,500
05421100	Pine Creek tributary near Winthrop, Ia.	Lat 42°29'17", long 91°47'10", in SW1/4 sec.27, T.89 N., R.8 W., Buchanan County, at culvert on county road, 2.5 mi northwest of Winthrop.	0.334	1953-	06-17-90	5.89	114
05421200	Pine Creek near Winthrop, Ia. (a) (c)1956 <440	Lat 42°28'11", long 91°47'01", in SW1/4 sec.34, T.89 N., R.8 W., Buchanan County, at railroad bridge, 500 ft upstream from State Highway 939, 2.5 mi northwest of Winthrop.	28.3		(c) 1958 (c) 06-17-78 (c) 06-18-79 (c) 03-16-80 (c) 09-26-81 (c) 05-22-82 (c) 07-09-84 (c) 07-23-85 (c) 1988 08-25-90	(a) 12.28 13.31 13.36 13.62 13.04 12.83 12.79 (a) 15.63	<440 617 979 1,000 1,140 860 788 775 <320 2,670
05421300	Pine Creek tributary No. 2 at Winthrop, Ia.	Lat 42°28'06", long 91°44'33", at N1/4 corner sec.2, T.88 N., R.8 W., Buchanan County, at culvert on State Highway 939, near west city limits of Winthrop.	0.704	1953-	1990	(a)	(+)
05421550	Buffalo Creek above Winthrop, Ia. (discontinued)	Lat 42°29'51", long 91°43'42", near NE corner sec.25, T.89 N., R.8 W., Buchanan County, at bridge on county highway W45, 1.5 mi northeast of Winthrop.	68.2	1957-	08-25-90	18.58	(+)

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Station no.	Station name	Location	Drainage area (mi ²)	Period of record	Date	Gage height (feet)	Annual maximum discharge (ft ³ /s)
Wapsipinicon River Basin--Continued							
05421600	Buffalo Creek near Winthrop, Ia. (discontinued)	Lat 42°28'07", long 91°43'04", in NE1/4 sec.1, T.88 N., R.8 W., Buchanan County, at bridge on State Highway 939, 1 mi east of Winthrop.	71.4	1953-	08-25-90	90.16	(+)
05421890	Silver Creek at Welton, Ia.	Lat 41°54'54", long 90°36'00", in NW1/4 sec.15, T.82 N., R.3 E., Clinton County, at bridge on U.S. Highway 61, at north edge of Welton.	9.03	1966-	05-23-66 04-21-67 1968 06-29-69 09-18-70 (c) 07-13-71 03-16-72 06-16-73 05-17-74 03-21-75 1976 1977 04-10-78 1979 1980 08-14-81 03-15-82 12-02-82 06-22-84 02-23-85 (c) 07-08-86 (c) 05-19-87 (c) 11-30-87 (c) 1989 08-19-90	88.41 87.86 (a) 88.03 88.73 88.34 86.60 89.49 89.77 88.42 (a) <354 (a) 85.29 86.76 89.13 87.58 86.95 87.32 88.67 89.82 85.91 87.20 (a) 89.43	2,770 1,970 <392 2,200 3,320 2,660 854 4,550 4,820 2,290 <354 <354 399 <341 747 2,600 1,040 689 766 1,280 2,050 371 600 <255 1,630
Iowa River Basin							
05448400	Westmain drainage ditch 1 & 2 near Britt, Ia.	Lat 43°06'09", long 93°47'04", in SW1/4 sec.27, T.96 N., R.25 W., Hancock County, at bridge on U.S. Highway 18, near east city limits of Britt.	21.2	1966-	1990	(a)	<53
05448600	East Branch Iowa River above Hayfield, Ia. (a) (+)	Lat 43°09'21", long 93°41'21", near S1/4 corner sec.4, T.96 N., R.24 W., Hancock County, at bridge on county highway, 1.5 mi southeast of Hayfield.	2.23	1953-			
05448700	East Branch Iowa River near Hayfield, Ia. (discontinued)	Lat 43°10'50", long 93°39'20", in NW1/4 sec.35, T.97 N., R.24 W., Hancock County, at bridge on county highway B20, 2 mi east of Hayfield.	7.94	1952-	04-24-90	8.24	92
05448800	East Branch Iowa River near Garner, Ia. (discontinued)	Lat 43°06'17", long 93°37'20", near center sec.25, T.96 N., R.24 W., Hancock County, at bridge on U.S. Highway 18, 1.2 mi west of Garner.	45.1	1952-	07-29-90	9.36	371
05448900	East Branch Iowa River tributary near Garner, Ia. (discontinued)	Lat 43°06'18", long 93°39'29", near E1/4 corner sec.27, T.96 N., R.24 W., Hancock County, at culvert on U.S. Highway 18, 2.1 mi west of Garner.	5.98	1952-	1990	(a)	(+)
05451955	Stein Creek near Clutier, Ia.	Lat 42°04'46", long 92°18'00", in NE1/4 sec.24, T.84 N., R.13 W., Tama County, at bridge on State Highway 318, 5 mi east of Clutier.	23.4	1971-	06-17-90	75.64	3,950
05453200	Price Creek at Amana, Ia.	Lat 41°48'18", long 91°52'23", in SE1/4 sec.22, T.81 N., R.9 W., Iowa County, at bridge on State Highway 149, near north edge of Amana.	29.1	1966-	06-17-90	88.78	(+)
05453430	North Fork tributary to Mill Creek near Solon, Ia.	Lat 41°50'24", long 91°30'04", in NW1/4 sec.12, T.81 N., R.6 W., Johnson County, at culvert on State Highway 1, 2 mi north of Solon.		1990-	08-25-90	(+)	(+)
05453600	Rapid Creek below Morse, Ia.	Lat 41°43'45", long 91°25'38", near NE corner sec.21, T.80 N., R.5 W., Johnson County, at bridge on county highway, 1.5 mi southeast of Morse.	8.12	1951-	06-16-90	25.03	2,410
05453750	Rapid Creek south- west of Morse, Ia.	Lat 41°43'23", long 91°26'16", in W1/2 sec. 21, T.80 N., R.5 W., Johnson County, at bridge on county highway, 2 mi southwest of Morse.	15.2	1951-	06-16-90	28.54	2,570

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Station no.	Station name	Location	Drainage area (mi ²)	Period of record	Date	Gage height (feet)	Annual maximum discharge (ft ³ /s)
Iowa River Basin--Continued							
05453850	Rapid Creek tributary No. 3 near Oasis, Ia.	Lat 41°42'33", long 91°27'14", near center sec.29, T.80 N., R.5 W., Johnson County, at bridge on county highway, 3.5 mi west of Oasis.	1.62	1951-	06-16-90	23.05	545
05453900	Rapid Creek tributary near Oasis, Ia.	Lat 41°41'14", long 91°26'37", near SW corner sec.33, T.80 N., R.5 W., Johnson County, at bridge on county highway X16, 3 mi southwest of Oasis.	0.97	1951-	06-16-90	15.45	388
05453950	Rapid Creek tributary near Iowa City, Ia.	Lat 41°41'56", long 91°28'39", in NW1/4 sec.31, T.80 N., R.5 W., Johnson County, at bridge on county highway, 4 mi northeast of Iowa City.	3.43	1951-	06-16-90	25.83	1,090
05454180	Clear Creek tributary near Williamsburg, Ia.	Lat 41°41'16", long 91°57'02", in SE1/4 sec.36, T.80 N., R.10 W., Iowa County, at culvert on county road 4 mi northeast of Williamsburg, 1 mi south of county highway F35.		1990-	06-16-90	(+)	(+)
05455140	North English River near Montezuma, Ia.	Lat 41°38'45", long 92°34'20", in SW1/4 sec.14, T.79 N., R.15 W., Poweshiek County, at bridge on county highway, 5.0 mi northwest of Montezuma.	31.0	1972-	06-17-90	27.67	3,970
05455210	North English River at Guernsey, Ia.	Lat 41°38'42", long 92°21'28", at NW corner sec.22, T.79 N., R.13 W., Poweshiek County, at bridge on State Highway 21, 1 mi southwest of Guernsey.	81.5	1960-, 1966-	06-17-90	86.38	7,570
05455230	Deep River at Deep River, Ia.	Lat 41°35'29", long 92°21'18", in SW1/4 sec.3, T.78 N., R.13 W., Poweshiek County, at bridge on State Highway 21, 1 mi northeast of Deep River.	30.5	1960-, 1966-	06-17-90	82.38	(+)
05455550	Bulgers run near Riverside, Ia.	Lat 41°29'02", long 91°37'36", in SE1/4 sec.11, T.77 N., R.7 W., Washington County, at bridge on State Highway 22, 2.5 mi west of Riverside.	6.31	1965-	1990	(+)	(+)
05457440	Deer Creek near Carpenter, Ia.	Lat 43°24'54", long 92°59'05", at NW corner sec.9, T.99 N., R.18 W., Mitchell County, at bridge on State Highway 105, 1.5 mi east of Carpenter.	91.6	1966-	07-29-90	85.01	3,800
0545776680	Gizzard Creek tributary near Bassett, Ia.	Lat 43°04'01", long 92°34'31", in SE1/4 sec.2, T.95 N., R.15 W., Floyd County, at culvert on U.S. Highway 18, 3.3 mi west of Bassett.		1990-	08-25-90	99.90	(+)
05458560	Beaverdam Creek near Sheffield, Ia. (discontinued)	Lat 42°56'11", long 93°12'09", at NW corner sec.27, T.94 N., R.20 W., Cerro Gordo County, at bridge on U.S. Highway 65, 3 mi north of Sheffield.	123	1966-	07-29-90	(+)	(+)
05459010	Elk Creek at Kensett, Ia. (discontinued)	Lat 43°22'18", long 93°12'37", in NE1/4 sec.28, T.99 N., R.20 W., Worth County, at bridge on U.S. Highway 65, 1 mi north of Kensett.	58.1	1966-	1990	(+)	(+)
05459490	Spring Creek near Mason City, Ia.	Lat 43°12'48", long 93°12'38", in SE1/4 sec.16, T.97 N., R.20 W., Cerro Gordo County, at bridge on U.S. Highway 65, 4 mi north of Mason City.	29.3	1966-	08-25-90	88.94	(+)
05460100	Willow Creek near Mason City, Ia.	Lat 43°08'55", long 93°16'07", near center sec.12, T.96 N., R.21 W., Cerro Gordo County, at bridge on U.S. Highway 18, 3.5 mi west of Mason City.	78.6	1966-	1990	(a)	(+)
05462750	Beaver Creek tributary near Aplington, Ia. (discontinued)	Lat 42°34'40", long 92°50'49", in NW1/4 sec.27, T.90 N., R.17 W., Butler County, at bridge on U.S. Highway 20, 2 mi east of Aplington.	11.6	1966-	07-29-90	93.65	1,270

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Station no.	Station name	Location	Drainage area (mi ²)	Period of record	Date	Gage height (feet)	Annual maximum Discharge (ft ³ /s)
Iowa River Basin--Continued							
05463090	Black Hawk Creek at Grundy Center, Ia. (discontinued)	Lat 42°22'10", long 92°46'05", in NW1/4 sec.7, T.87 N., R.16 W., Grundy County, at bridge on State Highway 14, at north edge of Grundy Center.	56.9	1966-	1990	(+)	(+)
05464145	Twelve Mile Creek near Traer, Ia.	Lat 42°13'50", long 92°27'56", in SE1/4 sec.27, T.86 N., R.14 W., Tama County, at bridge on U.S. Highway 63, 2.5 mi north of Traer.	43.8	1966-	06-16-90	88.93	(+)
05464310	Pratt Creek near Garrison, Ia.	Lat 42°10'53", long 92°11'10", in SE1/4 sec.12, T.85 N., R.12 W., Benton County at bridge on U.S. Highway 218, 3.5 mi northwest of Garrison.	23.4	1966-	06-16-90	94.53	5,280
05464318	East Blue Creek at Center Point, Ia.	Lat 42°12'44", long 91°47'21", in SW1/4 sec.33, T.86 N., R.8 W., Linn County, at bridge on State Highway 150, 1.5 mi north of Center Point.	17.6	1966-	08-25-90	82.75	(+)
05464880	Otter Creek at Wilton, Ia.	Lat 41°36'17", long 91°02'08", in NE1/4 sec.35, T.79 N., R.2 W., Cedar County, at bridge on State Highway 38, 1.5 mi northwest of Wilton.	10.7	1966-	06-16-90	89.68	(+)
05465150	North Fork Long Creek at Ainsworth, Ia.	Lat 41°16'51", long 91°32'16", in SW1/4 sec.22, T.75 N., R.6 W., Washington County, at bridge on U.S. Highway 218, 1 mi southeast of Ainsworth.	30.2	1951, 1965-	06-20-90	90.66	(+)
05469350	Haight Creek at Kingston, Ia.	Lat 40°58'14", long 91°02'30", in NW1/4 sec.12, T.71 N., R.2 W., Des Moines County, at culvert on State Highway 99, 0.5 mi south of Kingston.		1990-	06-16-90	(+)	(+)
Skunk River Basin							
05469860	Mud Lake drainage ditch 71 at Jewell, Ia.	Lat 42°18'52", long 93°38'23", in SW1/4 sec.27, T.87 N., R.24 W., Hamilton County, at bridge on U.S. Highway 69, in Jewell.	65.4	1966-	06-17-90	89.92	2,040
05469990	Keigley Branch near Story City, Ia.	Lat 42°09'01", long 93°37'13", in NW1/4 sec.26, T.85 N., R.24 W., Story County, at bridge on U.S. Highway 69, 3 mi south of Story City.	31.0	1966-	06-17-90	90.89	1,730
05472090	North Skunk River near Baxter, Ia.	Lat 41°49'13", long 93°03'41", in NE1/4 sec.21, T.81 N., R.19 W., Jasper County, at bridge on State Highway 223, 4.5 mi east of Baxter.	52.2	1966-	06-17-90	81.53	(+)
0547209280	Snipe Creek tributary at Melbourne, Ia.	Lat 41°56'08", long 93°05'08", in SE1/4 sec.5, T.82 N., R.19 W., Marshall County, at culvert on county highway E63, 0.5 mi east of Melbourne.		1990-	06-17-90	(+)	(+)
05472390	Middle Creek near Lacey, Ia.	Lat 42°43'55", long 93°42'26", at N1/4 corner sec.1, T.76 N., R.16 W., Mahaska County, at bridge on U.S. Highway 63, 1.5 mi northwest of Lacey.	23.0	1966-	06-17-90	89.31	3,900
05472555	Skunk River tributary near Richland, Ia.	Lat 41°15'50", long 91°57'52", in NE1/4 sec.35, T.75 N., R.10 W., Keokuk County, at culvert on county highway W15, 4.9 mi north of Richland, 5.1 mi south of State Highway 92.		1990-	06-20-90	(+)	(+)

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Station no.	Station name	Location	Drainage area (mi ²)	Period of record	Date	Gage height (feet)	Annual maximum Discharge (ft ³ /s)
Des Moines River Basin							
05480930	White Fox Creek at Clarion, Ia.	Lat 42°43'55", long 93°42'26", in NW1/4 sec.5, T.91 N., R.24 W., Wright County, at bridge on State Highway 3, 1.5 mi east of Clarion.	13.3	1966-	06-16-90	88.95	223
05480993	Brewers Creek tributary near Webster City, Ia.	Lat 42°26'57", long 93°51'59", in NW1/4 sec.10, T.88 N., R.26 W., Hamilton County, at culvert on U.S. Highway 20, 2.5 mi southwest of Webster City.		1990-	1990	(+)	(+)
05481510	Bluff Creek at Pilot Mound, Ia.	Lat 42°09'59", long 94°01'15", in NW 1/4 sec.20, T.85 N., R.27 W., Boone County, at bridge on State Highway 329, at northwest edge of Pilot Mound.	23.5	1966-	06-16-90	88.85	1,290
05481528	Peas Creek tributary at Boone, Ia.	Lat 42°02'06", long 93°51'13", in SW1/4 sec.35, T.84 N., R.26 W., Boone County, at culvert on Corporal Rodger Snedden Drive, at intersection with U.S. Highway 30, at the south edge of Boone city limits.		1990-	1990	(+)	(+)
05481530	Peas Creek at Boone, Ia.	Lat 42°02'04", long 93°51'25", in SE1/4 sec.34, T.84 N., R.26 W., Boone County, at culvert on U.S. Highway 30, at the southwest edge of Boone city limits.		1990-	1990	(+)	(+)
05481680	Beaver Creek at Beaver, Ia. (discontinued)	Lat 42°02'04", long 94°08'46", in NE1/4 sec.6, T.83 N., R.28 W., Boone County, at bridge on U.S. Highway 30, at southwest edge of Beaver.	38.5	1966-	06-16-90	89.87	1,790
05481690	West Beaver Creek at Grand Junction, Ia. (discontinued)	Lat 42°01'56", long 94°12'38", in NE1/4 sec.3, T.83 N., R.29 W., Greene County, at bridge on U.S. Highway 30, near east edge of Grand Junction.	12.6	1966-	1990	(+)	(+)
05482600	Hardin Creek at Farnhamville, Ia.	Lat 42°16'01", long 94°25'10", near NE corner sec.14, T.86 N., R.31 W., Calhoun County, at bridge on State Highway 175, near west city limits of Farnhamville.	43.7	1952-	06-16-90	10.39	1,980
05482800	Happy Run at Churdan, Ia. (discontinued)	Lat 42°10'16", long 94°29'39", in SW1/4 sec.17, T.85 N., R.31 W., Greene County, at bridge on county highway, 1 mi northwest of Churdan.	7.58	1952-	1990	(+)	(+)
05482900	Hardin Creek near Farlin, Ia.	Lat 42°05'34", long 94°25'39", near N1/4 corner sec.14, T.84 N., R.31 W., Greene County, at bridge on county highway, 1.5 mi northeast of Farlin.	101	1951-	06-16-90	12.89	2,470
05483318	Brushy Fork Creek near Templeton, Ia.	Lat 41°56'45", long 94°52'45", in NW1/4 sec.1, T.82 N., R.35 W., Carroll County, at bridge on U.S. Highway 71, 4 mi northeast of Templeton.	45.0	1966-	1990	(+)	(+)
05483349	Middle Raccoon River tributary at Carroll, Ia.	Lat 42°02'30", long 94°52'43", in NW1/4 sec.36, T.84 N., R.35 W., Carroll County, at bridge on U.S. Highway 71, 1.5 mi south of Carroll.	6.58	1966-	06-13-90	23.97	1,130
05485940	Cedar Creek tributary No. 2 near Winterset, Ia.	Lat 41°19'49", long 94°03'05", in SW1/4 sec.35, T.76 N., R.28 W., Madison County, at culvert on State Highway 92, 0.5 mi west of U.S. Highway 169, 1 mi west of Winterset.		1990-	06-17-90	96.39	(+)
05486230	Bush Branch Creek near Stanzel, Ia.	Lat 41°18'57", long 94°16'42", in SW1/4 sec.2, T.75 N., R.30 W., Adair County, at culvert on State Highway 92, 1 mi west of Stanzel.		1990-	06-17-90	92.19	(+)
05487350	South Otter Creek tributary near Woodburn, Ia.	Lat 41°02'48", long 93°35'26", near SW corner sec.11, T.72 N., R.24 W., Clarke County, at bridge on county highway, 2 mi north of Woodburn.	0.71	1955-	1990	(+)	(+)
05487800	White Breast Creek at Lucas, Ia.	Lat 41°01'24", long 93°27'56", in NE1/4 sec.23, T.72 N., R.23 W., Lucas County, at bridge on U.S. Highway 65, near south city limits of Lucas.	128	1953-	06-16-90	15.64	5,140

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Station no.	Station name	Location	Drainage area (mi ²)	Period of record	Date	Gage height (feet)	Annual maximum Discharge (ft ³ /s)
Des Moines River Basin--Continued							
05487825	Little White Breast Creek tributary near Chariton, Ia.	Lat 41°03'36", long 93°18'12", in SW1/4 sec.5, T.72 N., R.21 W., Lucas County, at culvert on State Highway 14, 2.0 mi north of Chariton.		1990-	06-16-90	(+)	(+)
05488620	Coal Creek near Albia, Ia.	Lat 41°01'02", long 92°50'46", in SW1/4 sec.20, T.72 N., R.17 W., Monroe County, at bridge on U.S. Highway 34, 2 mi southwest of Albia.	13.5	1966-	06-17-90	84.06	3,940
05489350	South Avery Creek near Blakesburg, Ia.	Lat 41°00'59", long 92°37'32", in SE1/4 sec.19, T.72 N., R.15 W., Wapello County, at bridge on U.S. Highway 34, 3.5 mi north of Blakesburg.	33.1	1965-	06-17-90	84.79	5,410
05489490	Bear Creek at Ottumwa, Ia.	Lat 41°00'43", long 92°27'54", in NW1/4 sec.27, T.72 N., R.14 W., Wapello County, at bridge on U.S. Highway 34, near west edge of Ottumwa.	22.9	1965-	05-25-90	90.76	3,890
Fox River Basin							
05494110	South Fox Creek near West Grove, Ia.	Lat 40°43'31", long 92°36'16", in SE1/4 sec.32, T.69 N., R.15 W., Davis County, at bridge on State Highway 2, 2.4 mi west of West Grove.	12.2	1965-	06-17-90	81.48	(+)
Big Sioux River Basin							
06483440	Dawson Creek near Sibley, Ia.	Lat 43°23'23", long 95°42'53", near NW corner sec.20, T.99 N., R.41 W., Osceola County, at culvert on county highway A30, 2 mi southeast of Sibley.	4.35	1952-	06-16-90	6.50	(+)
06483495	Burr Oak Creek near Perkins, Ia.	Lat 43°14'43", long 96°10'38", in SE1/4 sec.5, T.97 N., R.45 W., Sioux County, at bridge on U.S. Highway 75, 4 mi north of Perkins.	30.9	1966-	06-28-90	86.71	1,300
Perry Creek Basin							
06599800	Perry Creek near Merrill, Ia.	Lat 42°43'16", long 96°20'33", in NW1/4 sec.12, T.91 N., R.47 W., Plymouth County, at bridge on county highway C44, 5 mi west of Merrill.	8.17	1953-	05-19-90	9.72	(+)
06599950	Perry Creek near Hinton, Ia.	Lat 42°37'57", long 96°22'13", in NE1/4 sec.15, T.90 N., R.47 W., Plymouth County, at bridge on county highway, 4 mi west of Hinton.	30.8	1953-	05-19-90	37.90	(+)
Floyd River Basin							
06600030	Little Floyd River near Sanborn, Ia.	Lat 43°11'10", long 95°43'30", in NE1/4 sec.31, T.97 N., R.41 W., O'Brien County, at bridge on U.S. Highway 18, 3.5 mi west of Sanborn.	8.44	1966-	06-16-90	86.41	(+)
Monona-Harrison Ditch Basin							
06601480	Big Whiskey Slough near Remsen, Ia.	Lat 42°48'28", long 95°53'21", in NW1/4 sec.11, T.92 N., R.43 W., Plymouth County, at bridge on State Highway 3, 4.2 mi east of Remsen.	12.9	1966-	06-28-90	92.08	446
06602190	Elliott Creek at Lawton, Ia.	Lat 42°28'30", long 96°11'22", in NW1/4 sec.3, T.88 N., R.46 W., Woodbury County, at bridge on U.S. Highway 20, at west edge of Lawton.	34.8	1966-	05-23-90	81.78	1,960

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

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Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Station no.	Station name	Location	Drainage area (mi ²)	Period of record	Date	Gage height (feet)	Annual maximum Discharge (ft ³ /s)
Little Sioux River Basin							
06604510	Ocheyedan River near Ocheyedan, Ia.	Lat 43°25'58", long 95°36'41", in NE1/4 sec.6, T.99 N., R.40 W., Osceola County, at bridge on State Highway 9, 4 mi northwest of Ocheyedan.	73.5	1966-	06-16-90	81.17(a)(d)(+)	
06604584	Dry Run Creek near Harris, Ia.	Lat 43°26'42", long 95°27'21", in NE1/4 sec.33, T.100 N., R.39 W., Osceola County, at culvert on county highway M12, 1 mi west of Harris.		1990-	06-16-90	11.03	(+)
06605340	Prairie Creek near Spencer, Ia.	Lat 43°05'16", long 95°09'40", in SE1/4 sec.36, T.96 N., R.37 W., Clay County, at bridge on U.S. Highway 71, 4 mi south of Spencer.	22.3	1966-	1990	(a)	<160
06605750	Willow Creek near Cornell, Ia.	Lat 42°58'21", long 95°09'40", in SE1/4 sec.12, T.94 N., R.37 W., Clay County, at bridge on U.S. Highway 71, 2 mi northwest of Cornell.	78.6	1966-	1990	(a)	<340
06605890	Waterman Creek at Hartley, Ia. (discontinued)	Lat 43°11'06", long 95°30'43", in NE1/4 sec.36, T.97 N., R.40 W., O'Brien County, at bridge on U.S. Highway 18, 1.8 mi west of Hartley.	28.7	1966-	1990	(+)	(+)
06606790	Maple Creek near Alta, Ia. (discontinued)	Lat 42°44'56", long 95°22'16", in NE1/4 sec.31, T. 92 N., R.38 W., Buena Vista County, at bridge on State Highway 3, 6 mi northwest of Alta.	15.5	1966-	1990	(+)	(+)
0660683710	Halfway Creek at Schaller, Ia.	Lat 42°30'18", long 95°17'19", in SW1/4 sec.24, T.89 N., R.38 W., Sac County, at culvert on State Highway 110, 0.1 mi north of Schaller.		1990-	1990	(+)	(+)
06607197	Simmons Creek at Mapleton, Ia. (discontinued)	Lat 42°10'09", long 95°48'42", in SE1/4 sec.14, T.85 N., R.43 W., Monona County, at bridge on county road E16, 1 mi west of Mapleton.		1989-	06-17-90	13.82(e)	(+)
Soldier River Basin							
06608450	Jordan Creek at Moorhead, Ia. (discontinued)	Lat 41°54'59", long 95°51'33", in NW1/4 sec.16, T.82 N., R.43 W., Monona County, at bridge on State Highway 183, at southwest corner of Moorhead.	30.1	1966-	06-17-90	79.80	(+)
Boyer River Basin							
06609482	Boyer River tributary at Woodbine, Ia.	Lat 41°43'58", long 95°43'19", in SE1/4 sec.15, T.80 N., R.42 W., Harrison County, at culvert on county highway F32, 0.5 mi west of Woodbine.		1990-	07-26-90	86.18	(+)
06609560	Willow Creek near Soldier, Ia.	Lat 41°55'17", long 95°42'05", near S1/4 corner sec.11, T.82 N., R.42 W., Monona County, at bridge on State Highway 37, 6 mi southeast of Soldier.	29.1	1966-	06-17-90	80.40	4,010
Mosquito Creek Basin							
06610510	Moser Creek near Earling, Ia.	Lat 41°46'35", long 95°26'55", in NE1/4 sec.1, T.80 N., R.40 W., Shelby County, at bridge on State Highway 37, 1.5 mi west of Earling.	21.6	1966-	06-17-90	84.47	6,570
06610600	Mosquito Creek at Neola, Ia.	Lat 41°26'36", long 95°36'42", in NE1/4 sec.25, T.77 N., R.42 W., Pottawattamie County, at bridge on county highway, 0.5 mi south of Neola. Prior to 04-19-63, gage located 0.9 mi upstream, D.A. 128 mi ² .	131	1952-	06-17-90	30.26	(+)
0680737930	Elm Creek near Jacksonville, Ia.	Lat 41°38'44", long 95°12'18", in SW1/4 sec.18, T.79 N., R.37 W., Shelby County, at culvert on State Highway 44, 2.8 mi west of Jacksonville.		1990-	06-17-90	95.01	(+)
Nishnabotna River Basin							
06807418	Graybill Creek near Carson, Ia. (discontinued)	Lat 41°13'57", long 95°22'51", in NW1/4 sec.7, T.74 N., R.39 W., Pottawattamie County, at bridge on State Highway 92, 2 mi east of Carson.	45.9	1966-	1990	(a)	(+)

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Station no.	Station name	Location	Drainage area (mi ²)	Period of record	Date	Gage height (feet)	Discharge (ft ³ /s)
Nishnabotna River Basin--Continued							
06807470	Indian Creek near Emerson, Ia.	Lat 41°01'50", long 95°22'51", in NW1/4 sec.19, T.72 N., R.39 W., Montgomery County, at bridge on U.S. Highway 34, 1 mi east of Emerson.	37.3	1966-	06-16-90	86.77	1,210
06807760	Middle Silver Creek near Oakland, Ia.	Lat 41°19'28", long 95°33'18", near E1/4 corner sec.4, T.75., R.41 W., Pottawattamie County, at bridge on county highway, 8.5 mi northwest of Oakland.	25.7	1953-	07-26-90	12.23	1,140
06807780	Middle Silver Creek at Treynor, Ia. (discontinued)	Lat 41°14'37", long 95°36'53", near NE corner sec.1, T.74 N., R.42 W., Pottawattamie County, at bridge on county highway L55, 1 mi north of Treynor.	42.7	1953-	c09-08-89 07-26-90	5.75 5.66	1,000 980
06808880	Bluegrass Creek at Audubon, Ia.	Lat 41°42'46", long 94°55'43", in NW1/4 sec.28, T.80 N., R.35 W., Audubon County, at bridge on U.S. Highway 71, near south edge of Audubon.	15.4	1966-	06-16-90	86.92	(+)
Tarkio River Basin							
06811760	Tarkio River near Elliot, Ia.	Lat 41°06'06", long 95°06'09", near NE corner sec.28, T.73 N., R.37 W., Montgomery County, at bridge on county highway, 4.5 mi southeast of Elliot.	10.7	1952-	05-25-90	9.23	(+)
06811800	East Tarkio Creek near Stanton, Ia.	Lat 41°04'48", long 95°05'34", in W1/2 sec.34, T.73 N., R.37 W., Montgomery County, at bridge on county highway H24, 7 mi north of Stanton.	4.66	1952-	1990	(a)	<471
06811820	Tarkio River tributary near Stanton, Ia.	Lat 41°02'38", long 95°05'55", near NE corner sec.16, T.72 N., R.37 W., Montgomery County, at box culvert on county highway H63, 4 mi north of Stanton.	0.67	1952-	1990	(a)	(+)
06811875	Snake Creek near Yorktown, Ia.	Lat 40°44'33", long 95°07'46", in NW1/4 sec.32, T.69 N., R.37 W., Page County, at bridge on State Highway 2, 1.5 mi northeast of Yorktown.	9.10	1966-	06-17-90	91.51	1,640
Nodaway River Basin							
06816290	West Nodaway River at Massena, Ia.	Lat 41°14'44", long 94°45'27", in SE1/4 sec.33, T.75 N., R.34 W., Cass County, at bridge on State Highway 148, at southeast corner of Massena.	23.4	1966-	05-25-90	77.72	1,480
Platte River Basin							
06819110	Middle Branch 102 River near Gravity, Ia.	Lat 40°49'40", long 94°44'18", in SE1/4 sec.27, T.70 N., R.34 W., Taylor County, at bridge on State Highway 148, 4.8 mi north of Gravity.	33.5	1966-	1990	(a)	(+)
Chariton River Basin							
06903980	Chariton River near Udell, Ia	Lat 40°46'53", long 92°50'12", in NE1/4 sec.17, T.69 N., R.17 W., Appanoose County, at bridge on county highway, 5 mi west of Udell.	631	1972-	1990	(a)	(+)
06903990	Cooper Creek at Centerville, Ia. (discontinued)	Lat 40°45'02", long 92°51'36", in NW1/4 sec.30, T.69 N., R.17 W., Appanoose County, at bridge on State Highway 5, at north edge of Centerville.	47.8	1966-	05-25-90	73.40(d)	1,690

+ Not determined.

a Peak stage did not reach bottom of gage.

b Ice affected.

c Revised.

d Peak stage is at least this high but could be higher.

e Gage height affected by backwater.

< Less than.

MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05388250 UPPER IOWA RIVER NEAR DORCHESTER, IA (LAT 43 25 16N LONG 091 30 31W)									
OCT 1989 26...	1045	112	14.0	380	MAY 1990 24...	1500	703	18.0	510
DEC 07	1530	103	0.5	620	JUL 12...	1715	396	21.0	500
JAN 1990 19...	1600	239	0.5	580	AUG 21...	1255	1820	20.0	400
MAR 01...	1415	179	2.0	550	26...	1215	7340	20.0	320
APR 10...	0930	262	8.0	510	SEP 26...	1930	354	16.5	550
05411600 TURKEY RIVER AT SPILLVILLE, IA (LAT 43 12 28N LONG 091 56 56W)									
DEC 1989 08...	1000	8.8	0.0	640	JUL 1990 12...	1215	78	21.0	575
MAR 1990 02...	1045	19	0.0	425	AUG 24...	1045	132	21.0	575
09...	1830	936	0.5	200	26...	1550	2080	23.0	300
APR 09...	1435	48	11.5	520					
05412500 TURKEY RIVER AT GARBER, IA (LAT 42 44 24N LONG 091 15 42W)									
OCT 1989 25...	1740	166	17.0	590	APR 1990 10...	1420	416	10.0	540
JAN 1990 19...	1100	293	0.5	400	JUL 10...	1615	519	25.0	625
FEB 28...	1745	176	1.5	575	AUG 22...	1825	2770	21.0	500
MAR 09...	1445	2790	2.0	300					
05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IA (LAT 42 08 48N LONG 090 40 33W)									
OCT 1989 24...	1500	110	15.0	625	APR 1990 12...	0830	126	3.5	560
DEC 06...	1040	134	0.5	610	MAY 22...	1505	337	18.0	640
JAN 1990 18...	1130	1330	1.0	340	JUL 09...	1815	225	27.0	650
FEB 28...	1040	104	1.5	610					
05418500 MAQUOKETA RIVER NEAR MAQUOKETA, IA (LAT 42 05 05N LONG 090 38 04W)									
OCT 1989 24...	1030	342	10.5	590	APR 1990 12...	1035	229	6.5	570
DEC 05...	1530	223	2.5	640	MAY 22...	1150	2610	14.0	475
JAN 1990 18...	1600	1770	1.0	350	JUL 09...	1515	836	22.0	650
FEB 27...	1545	234	4.0	620					
05420500 MISSISSIPPI RIVER AT CLINTON, IA (LAT 41 46 53N LONG 090 15 04W)									
OCT 1989 20...	1700	18600	10.0	400	JUN 1990 01...	1425	53000	22.0	500
APR 1990 12...	1400	42900	11.0	325	22...	1530	118000	20.0	550
25...	1330	29900	21.0	320	AUG 21...	1445	60900	24.0	400
05420560 WAPSIPINICON RIVER NEAR ELMA, IA (LAT 43 14 34N LONG 092 31 48W)									
OCT 1989 20...	1150	5.7	10.0	560	MAY 1990 14...	1730	439	17.0	545
NOV 29...	1105	6.3	0.5	540	JUL 06...	0850	20	22.0	540
JAN 1990 08...	1125	5.7	3.0	495	AUG 06...	1550	173	21.0	440
FEB 21...	0740	9.8	0.5	420	27...	1215	579	22.0	480
MAR 09...	1315	295	3.0	210	SEP 26...	1625	16	19.0	430
27...	1135	25	6.0	530					

MISCELLANEOUS WATER-QUALITY DATA

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05421000 WAPSIPINICON RIVER AT INDEPENDENCE, IA (LAT 42 27 49N LONG 091 53 42W)									
OCT 1989 26...	1715	64	16.5	450	APR 1990 09...	1110	253	10.5	500
DEC 08...	1345	74	1.0	475	MAY 09... 29...	1440 1530	-- 1200	16.5 19.0	358 625
JAN 1990 22...	1100	60	1.5	550	JUL 13...	1115	741	20.5	500
MAR 02...	1500	77	2.0	540					
05422000 WAPSIPINICON RIVER NEAR DE WITT, IA (LAT 41 46 01N LONG 090 32 05W)									
OCT 1989 23...	1700	222	14.5	475	APR 1990 11...	1405	852	10.0	470
DEC 05...	1145	216	1.0	550	MAY 21... 05...	1900 1330	2500 5100	15.5 26.0	600 550
JAN 1990 16...	1700	185	0.0	550	AUG 21...	1945	7950	22.0	380
FEB 27...	1100	304	2.0	510					
05422470 CROW CREEK AT BETTENDORF, IA (LAT 41 33 03N LONG 090 27 15W)									
OCT 1989 23...	1300	1.2	11.5	770	MAY 1990 21...	1325	18	12.0	650
DEC 04...	1230	0.95	1.0	800	JUN 20...	1145	80	22.5	500
JAN 1990 16...	1200	3.2	0.0	670	JUL 05...	1615	24	24.0	750
FEB 26...	1515	5.4	1.5	900	AUG 17...	1615	1230	21.0	200
APR 11...	1130	7.0	8.0	625					
05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IA (LAT 43 00 31N LONG 093 37 42W)									
OCT 1989 16...	1000	2.5	10.0	1050	MAY 1990 14...	1215	631	16.0	730
NOV 27...	1045	2.4	2.0	730	JUL 05...	1145	25	25.0	800
JAN 1990 04...	1245	--	2.0	680	AUG 09...	1310	72	24.0	900
FEB 20...	1135	0.59	0.0	1100	SEP 25...	1230	27	18.0	830
MAR 26...	1050	12	4.0	750					
05449500 IOWA RIVER NEAR ROWAN, IA (LAT 42 45 36N LONG 093 37 23W)									
OCT 1989 11...	1010	8.3	12.5	930	MAR 1990 01...	1615	11	1.0	650
NOV 27...	0930	9.6	2.0	690	05...	1405	12	1.0	580
DEC 12...	0925	4.3	0.0	1000	26...	0905	39	3.0	720
JAN 26...	1155	3.7	0.0	930	MAY 14...	1010	49	15.5	700
JAN 1990 04...	1355	5.9	1.0	805	JUL 02...	1030	286	22.0	500
FEB 01...	1430	6.0	0.0	650	AUG 14...	1130	138	22.0	760
FEB 20...	0940	7.9	0.0	820	SEP 25...	1005	87	15.5	770
05451700 TIMBER CREEK NEAR MARSHALLTOWN, IA (LAT 42 00 25N LONG 092 51 15W)									
OCT 1989 03...	1140	1.2	9.0	620	APR 1990 24...	1450	31	23.0	420
NOV 08...	1120	3.2	9.0	660	JUN 07...	1155	112	17.0	600
JAN 1990 31...	1540	4.2	0.0	700	17...	1205	99	23.0	630
MAR 08...	1245	1440	2.0	210	SEP 19...	1410	42	16.0	640
MAR 12...	1445	79	15.0	590					

MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
RICHLAND CREEK NEAR HAVEN, IA (LAT 41 53 58N LONG 092 28 27W)									
NOV 1989 21...	1220	1.6	3.5	555	MAY 1990 02...	1155	23	14.0	550
JAN 1990 03...	1210	1.0	1.5	540	JUL 24...	1130	33	20.0	605
FEB 20...	1435	2.7	0.0	525	SEP 27...	0740	7.5	16.5	575
MAR 26...	1425	24	4.0	640					
SALT CREEK NEAR ELBERON, IA (LAT 41 57 51N LONG 092 18 47W)									
OCT 1989 11...	1240	4.6	12.0	525	MAR 1990 26...	1040	58	5.0	640
NOV 21...	1040	6.6	2.0	615	MAY 02...	1025	38	13.0	630
JAN 1990 03...	1035	3.0	0.0	620	JUL 24...	1415	17	20.0	675
FEB 20...	1230	11	0.0	605	SEP 27...	1000	48	16.0	670
WALNUT CREEK NEAR HARTWICK, IA (LAT 41 50 06N LONG 092 23 10W)									
OCT 1989 12...	1055	1.8	12.0	515	MAY 1990 02...	1335	25	16.0	575
NOV 21...	1325	2.9	4.0	540	JUL 25...	1045	28	20.5	560
FEB 1990 22...	1035	7.3	0.0	460	SEP 27...	1420	9.5	18.0	575
MAR 26...	1600	31	3.0	790					
BIG BEAR CREEK AT LADORA, IOWA (LAT 41 44 58N LONG 092 10 55W)									
OCT 1989 12...	1315	5.9	12.0	600	MAR 1990 27...	1250	80	5.0	675
NOV 21...	1515	6.3	4.0	920	MAY 02...	1505	59	17.0	630
JAN 1990 05...	1045	1.8	0.0	900	JUN 28...	1340	74	22.0	670
FEB 22...	1355	17	0.0	775	SEP 27...	1355	25	18.0	720
IOWA RIVER AT MARENGO, IA (LAT 41 48 48N LONG 092 03 51W)									
OCT 1989 12...	1445	107	12.0	475	MAR 1990 15...	1900	4900	2.0	450
NOV 22...	0935	126	2.0	560	MAY 21...	1430	4280	15.0	370
JAN 1990 03...	1420	62	0.0	705	JUL 26...	1235	3110	22.0	640
FEB 22...	1610	178	0.0	675					
RAPID CREEK NEAR IOWA CITY, IA (LAT 41 41 19N LONG 091 29 15W)									
OCT 1989 10...	1345	0.11	11.0	575	APR 1990 30...	1345	2.6	14.0	600
NOV 22...	1350	0.08	2.0	590	JUN 15...	1455	35	18.0	610
FEB 1990 12...	1150	2.0	1.0	460	SEP 24...	1150	3.7	10.5	660
MAR 28...	1550	6.7	8.0	620					
CLEAR CREEK NEAR CORALVILLE, IA (LAT 41 40 36N LONG 091 35 55W)									
OCT 1989 18...	1355	3.2	9.5	620	APR 1990 30...	1225	29	14.0	675
NOV 20...	1015	2.7	1.5	860	JUL 23...	1210	39	20.5	650
MAR 1990 27...	1520	33	9.0	695	SEP 24...	1450	29	14.0	650

MISCELLANEOUS WATER-QUALITY DATA

DATE	TIME	DIS-	CHARGE,	SPE-	CIFIC	DATE	TIME	DIS-	CHARGE,	SPE-	CIFIC
		INST.	INST.	TEMPER-	DUCT-			FEET	WATER	CON-	FEET
		CUBIC	SECOND	(DEG C)	(US/CM)	SECOND	(000010)	CUBIC	SECOND	(DEG C)	(US/CM)
05454500 IOWA RIVER AT IOWA CITY, IA (LAT 41 39 24N LONG 091 32 27W)											
OCT 1989 18...	1505	137		12.0	470	MAR 1990 29...		1345	1330	8.0	* 525
NOV 22...	1545	138		2.0	435	MAY 22...		1140	450	17.0	550
JAN 1990 04...	1010	132		2.5	500	JUL 03...		1235	7940	24.0	302
05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IA (LAT 41 39 05N LONG 091 30 27W)											
JAN 1990 04...	1220	1.8		1.0	825	JUN 1990 14...		1310	2.1	18.0	675
FEB 12...	0950	0.19		1.0	790	JUL 26...		1545	0.89	22.5	675
MAR 28...	1625	0.96		9.0	650	SEP 25...		0935	0.46	12.0	700
MAY 05...	1455	0.12		14.0	1250						
05455500 ENGLISH RIVER AT KALONA, IA (LAT 41 27 59N LONG 091 42 56W)											
OCT 1989 04...	1605	36		13.0	436	JUN 1990 07...		1120	330	16.0	442
NOV 09...	1055	30		7.0	480	JUL 12...		1020	653	21.0	399
JAN 1990 31...	1353	40		0.0	494	SEP 05...		1220	263	24.0	468
MAR 16...	1115	2130		8.0	408	28...		1430	74	19.0	496
APR 26...	1540	113		23.0	466						
05455700 IOWA RIVER NEAR LONE TREE, IA (LAT 41 25 15N LONG 091 28 25W)											
OCT 1989 06...	1000	315		12.0	492	JUL 1990 12...		1330	9970	23.0	372
NOV 09...	1320	218		9.0	482	AUG 25...		1225	195	22.0	530
APR 1990 27...	1110	878		19.0	595	27...		1345	7330	25.0	455
JUN 07...	1435	5660		18.5	513	SEP 27...		1205	1300	20.0	627
05457700 CEDAR RIVER AT CHARLES CITY, IA (LAT 43 03 45N LONG 092 40 23W)											
OCT 1989 17...	0830	133		10.0	540	MAR 1990 12...		1225	1710	4.0	400
NOV 27...	1540	149		1.0	600	26...		1810	344	5.0	640
JAN 1990 08...	1545	104		3.0	630	MAY 15...		0840	974	14.0	610
FEB 20...	1715	129		1.0	560	AUG 07...		0900	1860	20.0	600
						SEP 27...		0830	366	16.5	570
05458000 LITTLE CEDAR RIVER NEAR IONIA, IA (LAT 43 02 05N LONG 092 30 05W)											
OCT 1989 16...	1650	9.7		11.5	430	MAY 1990 14...		1930	148	18.0	580
NOV 28...	0800	6.3		1.0	480	JUL 06...		1045	98	22.0	600
JAN 1990 08...	1310	5.2		4.0	690	AUG 06...		1800	846	21.0	520
FEB 21...	0915	17		1.0	460	27...		1450	2770	22.0	520
MAR 27...	0800	83		4.0	530	SEP 26...		1830	78	20.0	470
05458500 CEDAR RIVER AT JANESVILLE, IA (LAT 42 38 54N LONG 092 27 54W)											
OCT 1989 17...	1350	158		13.0	460	MAY 1990 15...		1530	1370	16.0	580
NOV 28...	1410	189		0.5	590	JUL 10...		1510	718	26.0	440
JAN 1990 04...	1040	100		0.0	645	AUG 07...		1610	4540	21.0	640
FEB 21...	1525	174		2.0	600	SEP 27...		1410	676	20.0	530
MAR 27...	1210	2680		7.0	660						
	1810	555		9.0	550						

MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IA (LAT 42 37 50N LONG 092 32 24W)									
OCT 1989 17...	1215	14	10.0	450	MAY 1990 15...	1245	332	16.0	655
NOV 28.	1250	22	0.0	630	21...	1320	1960	14.0	550
JAN 1990 09...	0915	15	1.0	475	JUL 10...	1255	418	25.5	630
FEB 21...	1245	22	0.5	640	AUG 07...	1350	1570	21.0	680
MAR 09...	1250	275	3.0	320	SEP 27...	1230	289	20.0	590
27...	1615	220	9.0	630					
05459500 WINNEBAGO RIVER AT MASON CITY, IA (LAT 43 09 54N LONG 093 11 33W)									
OCT 1989 11...	1210	11	16.0	740	MAY 1990 14...	1505	217	17.0	790
NOV 27.	1325	18	1.5	875	JUL 05...	1655	100	27.0	750
JAN 1990 04...	1020	8.1	0.0	1040	AUG 06...	1300	1060	19.0	570
FEB 20...	1540	13	2.0	850	SEP 26...	1150	101	17.5	740
MAR 26...	1455	97	7.0	820					
05462000 SHELL ROCK RIVER AT SHELL ROCK, IA (LAT 42 39 10N LONG 092 35 45W)									
OCT 1989 02...	1120	72	15.0	560	MAY 1990 15...	1100	711	15.5	680
17...	1045	79	10.0	530	JUL 09...	1430	444	25.0	530
NOV 28.	1120	49	1.0	650	AUG 07...	1140	2800	20.0	630
JAN 1990 09...	0750	53	2.0	680	SEP 27...	1035	619	17.0	630
FEB 21...	1130	78	3.0	790					
MAR 27...	1435	418	9.0	650					
05463000 BEAVER CREEK AT NEW HARTFORD, IA (LAT 42 30 50N LONG 092 37 55W)									
OCT 1989 18...	1055	10	8.0	570	MAY 1990 16...	1130	222	15.0	580
NOV 28.	1600	12	0.0	600	JUL 20...	1235	2250	13.5	460
JAN 1990 09...	1345	5.9	1.0	540	AUG 10...	1015	215	23.5	650
FEB 21...	1400	9.5	2.0	600	SEP 08...	1150	284	21.0	610
MAR 09...	1150	617	3.0	280	27...	1620	160	20.0	760
05463500 BLACK HAWK CREEK AT HUDSON, IA (LAT 42 24 28N LONG 092 27 47W)									
OCT 1989 18...	0845	2.9	5.5	720	MAY 1990 16...	0845	275	15.0	655
NOV 29.	0745	6.5	0.0	780	20...	1515	2420	14.0	510
JAN 1990 09...	1230	2.1	0.0	840	JUL 11...	0930	197	21.0	620
FEB 22...	0835	6.0	0.0	700	AUG 08...	0930	259	21.0	580
MAR 09...	1500	637	2.0	280	SEP 28...	0925	101	17.0	610
28...	1355	50	10.0	610					
05464000 CEDAR RIVER AT WATERLOO, IA (LAT 42 29 44N LONG 092 20 03W)									
OCT 1989 06...	1145	411	12.5	430	APR 1990 13...	1230	1040	10.0	480
DEC 11.	1345	253	0.0	678	SEP 26...	1615	2330	18.5	640
JAN 1990 23...	1215	285	1.5	634					

MISCELLANEOUS WATER-QUALITY DATA

DATE	TIME	DIS-	CHARGE,	SPE-	CIFIC	DATE	TIME	DIS-	CHARGE,	SPE-	CIFIC
		INST.	CUBIC	TEMPER-	CON-			FEET	ATURE	DUCT-	INST.
		PER	WATER	ANCE	(US/CM)	SECOND	(DEG C)	PER	WATER	ANCE	(US/CM)
05464500 CEDAR RIVER AT CEDAR RAPIDS, IA (LAT 41 58 14N LONG 091 40 01W)											
NOV 1989 15...	1345	610	7.5	450		APR 1990 13...	1800	1350	9.0	480	
JAN 1990 10...	1015	298	2.0	600		MAY 23...	1345	10300	14.5	522	
MAR 02...	1450	543	4.5	582		SEP 26...	1145	3140	--	580	
05465000 CEDAR RIVER NEAR CONESVILLE, IA (LAT 41 24 36N LONG 091 17 06W)											
OCT 1989 06...	1230	680	14.0	600		APR 1990 27...	1345	1840	21.0	496	
NOV 13...	1055	684	10.0	573		JUN 08...	1130	6620	18.0	550	
DEC 28...	1145	355	0.0	914		JUL 13...	1345	5480	21.0	607	
FEB 1990 12...	1540	938	7.0	421		SEP 04...	1500	13800	25.0	474	
MAR 19...	1045	7980	5.0	478		27...	1605	3620	20.0	562	
05470000 SOUTH SKUNK RIVER NEAR AMES, IA (LAT 42 04 05N LONG 093 37 02W)											
NOV 1989 09...	1015	15	4.0	910		JUN 1990 08...	1005	308	17.0	840	
FEB 1990 02...	1105	5.2	1.0	1000		JUL 16...	1600	393	27.0	700	
MAR 14...	1450	498	10.0	740		AUG 24...	1025	130	24.0	690	
APR 25...	1040	71	22.0	750							
05470500 SQUAW CREEK AT AMES, IA (LAT 42 01 21N LONG 093 37 45W)											
NOV 1989 09...	0850	4.0	4.0	760		JUN 1990 08...	0910	189	17.0	740	
FEB 1990 01...	0945	2.1	1.0	850		JUL 16...	1830	321	27.0	610	
APR 25...	0915	33	19.0	660		AUG 24...	0845	111	22.0	530	
05471200 INDIAN CREEK NEAR MINGO, IA (LAT 41 48 17N LONG 093 18 36W)											
OCT 1989 10...	1620	1.2	15.0	580		MAR 1990 29...	1100	75	6.0	800	
NOV 16...	1035	2.4	0.5	720		JUL 26...	1200	420	21.0	720	
JAN 1990 08...	1040	1.5	0.0	750		SEP 27...	1135	32	18.0	730	
FEB 15...	1050	5.4	0.0	710							
05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IA (LAT 41 21 19N LONG 092 39 31W)											
OCT 1989 16...	1200	56	13.5	680		MAY 1990 07...	1050	965	16.0	670	
NOV 20...	0955	78	1.0	790		JUL 23...	1100	4650	21.0	570	
JAN 1990 03...	1020	20	0.0	740		SEP 24...	1045	306	13.5	600	
FEB 12...	1150	101	0.5	620							
05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IA (LAT 41 18 03N LONG 092 12 16W)											
OCT 1989 02...	1020	53	14.0	475		JUN 1990 04...	1045	647	16.0	502	
NOV 06...	0940	60	7.5	548		19...	1600	12000	23.0	185	
DEC 12...	1035	12	0.0	316		JUL 09...	1100	484	26.0	500	
JAN 1990 29...	1015	96	0.0	438		AUG 28...	1240	474	25.0	359	
APR 24...	0935	247	18.0	498		SEP 24...	1230	112	15.0	495	
MAY 21...	0935	776	15.0	490							

MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05473400 CEDAR CREEK NEAR OAKLAND MILLS, IA (LAT 40 55 20N LONG 091 40 10W)									
OCT 1989 04...	1247	10	13.0	564	JUN 1990 06...	1305	128	16.0	526
NOV 08...	1335	10	10.0	704	JUL 11...	1235	104	24.0	548
JAN 1990 31...	1035	25	0.0	681	AUG 31...	1425	89	26.0	491
APR 26...	1230	69	23.0	544	SEP 28...	1050	13	19.0	622
05476500 DES MOINES RIVER AT ESTHERVILLE, IA (LAT 43 23 51N LONG 094 50 38W)									
OCT 1989 12...	1220	1.5	16.5	2950	MAY 1990 08...	1130	52	19.0	1120
NOV 21...	1345	17	1.0	1550	JUN 12...	1300	210	28.0	1040
JAN 1990 02...	1005	3.1	2.0	2500	JUL 31...	1215	157	22.0	920
FEB 12...	1035	5.2	3.0	1950	SEP 19...	1420	7.5	17.0	1220
MAR 28...	1200	46	8.0	800					
05476750 DES MOINES RIVER AT HUMBOLDT, IA (LAT 42 43 12N LONG 094 13 06W)									
OCT 1989 10...	1300	27	15.0	970	MAR 1990 21...	1415	123	12.0	880
NOV 17...	1130	26	1.0	780	MAY 07...	1300	104	20.0	950
JAN 1990 13...	0850	19	2.0	705	SEP 24...	1200	91	18.0	560
FEB 12...	1200	32	5.0	850					
05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IA (LAT 42 43 26N LONG 094 11 30W)									
OCT 1989 10...	1515	13	14.0	850	MAY 1990 07...	1430	58	24.0	710
NOV 17...	0940	26	0.0	1100	AUG 03...	1145	984	25.0	740
JAN 1990 03...	1015	13	3.0	1200	SEP 28...	1045	1350	26.0	720
FEB 12...	1000	20	2.5	950		1415	122	18.0	890
MAR 21...	1215	72	10.0	700					
05480500 DES MOINES RIVER AT FORT DODGE, IA (LAT 42 30 22N LONG 094 12 04W)									
OCT 1989 13...	1010	57	16.0	690	FEB 1990 12...	1415	69	5.0	800
NOV 17...	1500	55	0.0	700	MAR 16...	1155	746	6.5	625
DEC 19...	1400	30	0.0	1000	MAY 14...	1115	633	15.0	730
JAN 1990 03...	0900	33	0.0	1350	JUN 15...	1030	3880	24.0	505
	1215	39	0.0	1120		0900	12200	23.0	520
05481000 BOONE RIVER NEAR WEBSTER CITY, IA (LAT 42 26 01N LONG 093 48 12W)									
OCT 1989 06...	1120	43	14.0	560	JUN 1990 04...	1130	902	15.0	790
NOV 06...	1045	69	7.0	810	JUL 17...	2030	4530	21.0	440
FEB 1990 01...	1310	20	0.0	950	SEP 17...	1300	197	29.0	770
MAR 16...	1340	1600	10.0	600		1450	78	22.5	760
APR 20...	1210	239	15.0	750					

MISCELLANEOUS WATER-QUALITY DATA

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC TEMPER- ATURE WATER (DEG C) (00010)				
		CON- DUCT- ANCE (US/CM) (00095)	CON- DUCT- ANCE (US/CM)						
05481300 DES MOINES RIVER NEAR STRATFORD, IA (LAT 42 15 04N LONG 093 59 52W)									
OCT 1989 06... NOV 06... DEC 05... 14... 26... JAN 1990 12... 26...	1310 1300 1115 1520 1035 1340 1400	198 249 123 75 33 82 104	15.0 7.0 2.0 0.0 0.0 0.0 0.0	740 850 1050 750 1300 1000 1090	FEB 1990 22... 28... MAR 05... 21... SEP 27... 1520	88 131 1130 173 1150 1290 374 20.0	2.0 3.0 1.5 10.0 20.0	940 840 760 740 700	
05481950 BEAVER CREEK NEAR GRIMES, IA (LAT 41 41 18N LONG 093 44 08W)									
OCT 1989 04... JAN 1990 31... MAR 13... 21... APR 24...	1850 0920 1700 1400 0915	0.15 4.1 828 337 869	14.0 0.0 13.0 9.0 20.0	860 890 490 800 650	MAY 1990 22... JUN 06... 17... AUG 28...	1110 0810 1625 1000 388	1800 377 2510 388	15.0 16.0 29.0 27.0	520 750 110 690
05482135 NORTH RACCOON RIVER NEAR NEWELL, IA (LAT 42 36 16N LONG 095 02 42W)									
OCT 1989 11... NOV 15... DEC 01... 27... FEB 1990 13... 28...	1330 1545 1230 1055 1105 0900	4.8 3.1 0.82 0.08 2.8 2.5	20.0 5.0 0.0 1120 0.0 0.0	940 690 540 1120 640 790	MAR 1990 06... 27... MAY 11... 31... AUG 02... SEP 18...	1110 1345 1300 1130 0935 1445	5.4 20 79 149 76 8.7	0.0 11.5 12.0 17.0 20.0 14.5	660 720 800 740 750 550
05482170 BIG CEDAR CREEK NEAR VARINA, IA (LAT 42 41 16N LONG 094 47 52W)									
OCT 1989 11... FEB 1990 13... MAR 29... MAY 07...	1115 0950 1300 1035	0.31 0.17 2.5 2.4	16.0 0.0 7.0 17.0	1750 1780 920 960	JUN 1990 11... AUG 11... SEP 18...	1130 0955 1230 1230	56 8.3 9.7	24.0 19.0 16.0	900 770 750
05482300 NORTH RACCOON RIVER NEAR SAC CITY, IA (LAT 42 21 16N LONG 094 59 26W)									
OCT 1989 12... NOV 17... DEC 01... 12... 27... JAN 1990 12... 26... FEB 13... 28...	1640 1105 1500 1340 1245 1045 1230 1230 1025	13 10 11 7.4 3.8 5.0 8.6 27 18	17.0 6.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	1120 1080 1100 1100 1150 840 890 580 1090	MAR 1990 05... 27... MAY 05... 23... JUN 13... SEP 20...	0900 1055 1055 1105 1915 22... 1920 1415	28 83 291 1210 2980 4310 106	0.0 8.0 12.0 16.0 24.0 15.0 15.0	800 810 710 650 675 625 650
05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IA (LAT 41 59 17N LONG 094 22 36W)									
OCT 1989 03... NOV 20... DEC 27... FEB 1990 13... MAR 12...	1230 1200 1610 1610 1300	32 47 12 48 235	22.0 3.0 0.0 2.0 15.0	670 920 1000 940 640	MAY 1990 11... 20... 25... JUN 14... AUG 03... SEP 21...	1310 1030 1445 1250 1140 3420 1250 1615	316 4690 8250 1140 281	14.0 15.0 16.0 22.0 19.0 660	650 430 490 480 760 660

MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC COND. (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC COND. (US/CM) (00095)
05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IA (LAT 42 06 27N LONG 094 22 12W)									
NOV 1989 20...	1040	0.09	3.0	1000	MAY 1990 11...	0945	12	9.0	850
FEB 1990 13...	1525	0.27	0.0	590	19...	1420	226	15.0	690
MAR 12...	1500	7.2	13.0	880	25...	1300	213	15.0	560
					JUN 14...	1315	78	23.0	520
					AUG 03...	1010	32	18.0	610
05483450 MIDDLE RACCOON RIVER NEAR BAYARD, IA (LAT 41 46 43N LONG 094 29 33W)									
OCT 1989 04...	1150	49	10.0	650	MAY 1990 19...	1150	3380	15.0	820
NOV 07...	1100	63	7.0	660	JUN 05...	1150	313	18.0	740
DEC 18...	1205	23	0.0	990	JUL 16...	1115	448	26.0	540
JAN 1990 30...	1050	28	0.0	540	AUG 29...	1355	235	27.0	620
MAR 14...	1715	1000	12.5	660					
05483600 MIDDLE RACCOON RIVER AT PANORA, IA (LAT 41 41 14N LONG 094 22 15W)									
OCT 1989 10...	1345	90	16.0	520	MAY 1990 19...	1405	3510	15.0	760
NOV 07...	1310	45	10.0	600	JUN 18...	1845	7240	23.0	200
DEC 18...	1425	34	0.5	540	JUL 16...	1400	652	26.0	760
MAR 1990 20...	1210	439	8.0	570	SEP 26...	1255	67	16.0	600
APR 23...	1350	114	17.0	710					
05484000 SOUTH RACCOON RIVER AT REDFIELD, IA (LAT 41 35 22N LONG 094 09 33W)									
OCT 1989 10...	1205	347	13.0	490	MAY 1990 19...	1720	5770	15.0	800
NOV 07...	1510	113	10.0	560	JUL 16...	1410	1160	26.0	600
DEC 14...	1245	76	0.0	690	AUG 27...	1245	623	26.0	580
APR 1990 23...	1545	253	25.0	540					
05484800 WALNUT CREEK AT DES MOINES, IA (LAT 41 35 14N LONG 093 42 11W)									
OCT 1989 12...	1245	3.3	16.5	770	JUN 1990 16...	1315	5280	20.0	250
NOV 17...	1030	4.7	0.5	760	16...	1800	6460	20.0	275
JAN 1990 05...	0850	2.9	0.0	1220	JUL 25...	0755	62	21.0	770
FEB 14...	0915	4.8	0.0	1050	SEP 25...	1535	4.4	24.0	760
MAR 28...	0745	62	6.5	760					
05485500 DES MOINES RIVER BELOW RACCOON R AT DES MOINES, I(LAT 41 34 30N LONG 093 35 48									
OCT 1989 12...	0855	421	10.0	530	MAY 1990 09...	1125	1850	17.0	610
NOV 22...	0915	388	3.0	550	JUN 17...	1320	49000	25.0	280
JAN 1990 09...	1125	320	0.0	750	JUL 25...	1050	8790	23.0	660
FEB 14...	1115	345	1.0	340	SEP 26...	1040	1060	20.0	620
MAR 28...	1135	2500	6.5	650					

MISCELLANEOUS WATER-QUALITY DATA

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05485640 FOURMILE CREEK AT DES MOINES, IA (LAT 41 36 50N LONG 093 32 43W)									
OCT 1989 11...	1600	6.2	21.0	1200	MAY 1990 09...	1310	107	15.0	810
NOV 17...	0935	6.6	0.5	1600	JUN 16...	1530	4370	20.0	260
JAN 1990 09...	0935	5.9	0.0	1720	JUL 25...	1300	146	20.5	800
FEB 14...	1305	5.9	0.5	1200	SEP 11...	1410	10	27.0	1050
MAR 28...	1330	69	7.0	850					
05486000 NORTH RIVER NEAR NORWALK, IA (LAT 41 27 25N LONG 093 39 10W)									
OCT 1989 12...	1700	39	18.0	500	MAY 1990 08...	1450	144	20.0	480
NOV 21...	1430	18	3.0	540	JUN 17...	1730	18800	26.0	220
JAN 1990 04...	1610	9.6	0.0	600	18...	0940	9970	22.0	220
FEB 13...	1610	57	1.0	390	JUL 24...	1700	153	23.0	470
MAR 27...	1550	211	7.0	600	SEP 18...	1130	7.1	16.5	520
05486490 MIDDLE RIVER NEAR INDIANOLA, IA (LAT 41 25 27N LONG 093 35 09W)									
OCT 1989 12...	1700	39	18.0	500	MAY 1990 08...	1300	160	20.0	510
NOV 21...	1240	33	3.0	510	JUN 17...	2050	12700	25.0	200
JAN 1990 04...	1445	14	0.0	650	JUL 24...	1435	181	24.0	510
FEB 13...	1420	64	1.0	470	SEP 25...	1140	24	17.0	580
MAR 27...	1240	236	7.0	520					
05487470 SOUTH RIVER NEAR ACKWORTH, IA (LAT 41 20 14N LONG 093 28 10W)									
OCT 1989 13...	0800	1.2	10.5	590	MAY 1990 08...	1105	186	18.0	520
NOV 21...	1045	2.9	2.0	580	JUL 24...	1255	372	23.0	390
FEB 1990 13...	1235	22	2.5	450	SEP 25...	0845	9.3	15.0	540
MAR 27...	1125	55	7.0	550					
05487500 DES MOINES RIVER NEAR RUNNELLS, IA (LAT 41 29 19N LONG 093 20 17W)									
OCT 1989 11...	1310	653	15.5	600	JUN 1990 18...	1600	85200	24.0	220
NOV 16...	1555	482	2.5	640	SEP 07...	1025	2880	27.0	630
05487980 WHITE BREAST CREEK NEAR DALLAS, IA (LAT 41 14 41N LONG 093 16 08W)									
OCT 1989 13...	1010	0.05	12.5	480	MAR 1990 27...	0800	37	4.0	580
NOV 21...	0850	1.8	2.0	600	MAY 08...	0825	170	17.0	500
JAN 1990 04...	0915	5.5	0.0	660	JUL 24...	1015	245	21.5	390
FEB 13...	1035	14	2.5	560					
05488200 ENGLISH CREEK NEAR KNOXVILLE, IA (LAT 41 16 00N LONG 093 05 00W)									
OCT 1989 13...	1205	0.18	14.0	840	MAY 1990 07...	1720	72	18.0	500
NOV 20...	1610	0.80	4.0	840	JUN 26...	1530	2140	18.0	260
JAN 1990 03...	1450	1.2	0.0	900	21...	0835	147	21.0	340
FEB 13...	0845	4.8	1.5	860	JUL 24...	0815	73	20.0	395
MAR 26...	1610	17	7.0	630	SEP 17...	1145	0.12	17.0	410

MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
05488500 DES MOINES RIVER NEAR TRACY, IA (LAT 41 16 53N LONG 092 51 34W)									
OCT 1989 16...	1410	651	13.0	470	MAY 1990 07...	1330	6620	16.0	500
NOV 20...	1205	411	7.5	510	JUL 23...	1150	16200	25.0	520
FEB 1990 12...	1420	662	7.0	670	SEP 24...	1300	1140	18.5	460
MAR 26...	1430	4230	6.5	500					
05489000 CEDAR CREEK NEAR BUSSEY, IA (LAT 41 13 09N LONG 092 54 38W)									
OCT 1989 13...	1400	2.7	21.5	850	MAY 1990 07...	1540	400	17.0	500
NOV 20...	1425	3.8	4.5	950	JUN 21...	1115	956	21.5	315
JAN 1990 03...	1315	8.9	0.0	920	JUL 23...	1610	477	22.0	360
FEB 12...	1620	16	5.0	740	SEP 24...	1430	15	15.0	680
MAR 23...	1010	98	3.0	620					
05489500 DES MOINES RIVER AT OTTUMWA, IA (LAT 41 00 39N LONG 092 24 40W)									
MAR 1990 12...	1155	12400	10.0	463	AUG 1990 28...	1705	14500	27.0	611
APR 24...	1430	2900	18.0	630	SEP 26...	1420	1420	--	665
JUN 04...	1415	19100	18.0	549					
05490500 DES MOINES RIVER AT KEOSAUQUA, IA (LAT 40 43 40N LONG 091 57 34W)									
OCT 1989 04...	1020	445	12.0	446	MAY 1990 29...	1320	12000	19.0	538
NOV 08...	1050	736	11.0	508	JUL 11...	1020	24300	24.0	405
DEC 19...	1540	466	0.0	230	AUG 31...	1050	13400	26.0	582
MAR 1990 14...	1035	13200	10.0	476	SEP 26...	1420	1380	24.0	610
APR 26...	1010	2800	21.0	512					
06483500 ROCK RIVER NEAR ROCK VALLEY, IA (LAT 43 12 52N LONG 096 17 39W)									
OCT 1989 03...	1540	19	13.5	740	MAY 1990 17...	1450	115	17.0	910
24...	1435	19	13.0	710	JUN 21...	0915	787	21.0	560
JAN 1990 09...	1630	4.5	0.0	910	AUG 02...	0835	130	22.0	575
FEB 21...	1530	12	0.0	880	SEP 18...	1500	30	15.0	650
MAR 27...	1500	146	10.0	730					
06600000 PERRY CREEK AT 38TH STREET, SIOUX CITY, IA (LAT 42 32 05N LONG 096 24 35W)									
OCT 1989 26...	1310	2.7	15.0	820	MAY 1990 31...	1035	19	60.0	825
JAN 1990 11...	0910	4.4	0.0	825	JUN 19...	1130	19	21.0	680
FEB 22...	1520	7.2	0.5	750	AUG 02...	1550	7.1	24.5	780
MAR 30...	0830	11	11.0	550	SEP 19...	1430	4.7	16.0	730
06600100 FLOYD RIVER AT ALTON, IA (LAT 42 58 55N LONG 096 00 03W)									
OCT 1989 24...	1215	2.8	11.0	1430	MAY 1990 18...	1125	15	15.0	1030
JAN 1990 09...	1200	0.93	0.0	1900	JUN 20...	1315	848	22.0	430
FEB 22...	1000	1.9	0.0	1660	SEP 19...	0940	5.1	15.0	1000
MAR 27...	1125	13	6.0	1060					

MISCELLANEOUS WATER-QUALITY DATA

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET			SPE- CIFIC TEMPER- ATURE			DIS- CHARGE, INST. CUBIC FEET			SPE- CIFIC TEMPER- ATURE		
		PER SECOND (00061)	WATER (DEG C) (00010)	ANCE (US/CM) (00095)	CON- DUCT-	PER SECOND (00061)	WATER (DEG C) (00010)	ANCE (US/CM) (00095)	CON- DUCT-	PER SECOND (00061)	WATER (DEG C) (00010)	ANCE (US/CM) (00095)	

06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IA (LAT 42 55 15N LONG 096 10 30W)

OCT 1989					MAY 1990				
03...	1335	3.0	13.0	1360	17...	1210	15	15.5	1180
24...	0950	3.8	8.0	1370	JUN				
JAN 1990					20...	1030	500	21.0	430
09...	1015	2.6	0.0	1290	AUG				
FEB					02...	1310	19	23.5	1120
21...	1215	3.5	0.0	1430	SEP				
MAR					19...	1155	13	15.0	1130
27...	0900	9.9	3.0	1330					

06600500 FLOYD RIVER AT JAMES, IA (LAT 42 34 36N LONG 096 18 43W)

OCT 1989					FEB 1990				
03...	1050	22	8.0	990	08...	1300	36	0.0	1300
26...	1145	30	17.0	1040	14...	1315	15	0.0	1130
NOV					21...	1000	24	0.0	1150
21...	1045	40	0.0	1070	26...	1350	--	41.0	900
24...	1210	30	0.0	1270	MAR				
DEC					05...	1530	53	1.0	1000
05...	1515	32	0.0	1300	28...	1630	54	9.0	1100
13...	1130	19	0.0	1300	JUN				
22...	1440	9.6	0.0	1300	19...	1525	1100	23.0	555
27...	1530	12	0.0	1200	JUL				
JAN 1990					27...	1150	170	76.0	852
08...	1600	22	0.0	1190	30...	1640	142	27.0	825
19...	1000	40	0.0	1100	SEP				
24...	0830	26	0.0	1150	21...	0900	50	13.0	970
31...	1130	24	0.0	1200					

06601200 MISSOURI RIVER AT DECATUR, NE (LAT 42 00 26N LONG 096 14 29W)

OCT 1989				MAY 1990				
05...	1145	30100	13.5	820	02...	1150	27200	
10...	1355	30700	14.0	810	08...	1430	25100	
23...	1130	31300	11.5	830	14...	1500	29500	
30...	1500	18900	14.0	798	24...	1400	29800	
NOV				31...	1650	26800	19.5	
09...	1200	11400	8.0	850	JUN			
14...	1140	11000	7.0	830	02...	1130	29100	
20...	1600	11200	2.0	850	08...	1120	24900	
27...	1205	11200	3.0	880	12...	1030	24800	
DEC				27...	1330	30600	27.0	
06...	1115	12300	2.0	775	JUL			
JAN 1990				02...	1840	28100	27.0	
19...	1345	12700	1.0	850	10...	1200	27100	
24...	1215	11500	1.0	800	23...	1640	28700	
31...	1440	13700	2.0	780	30...	1410	26000	
FEB				AUG				
06...	1230	14400	2.0	820	07...	1210	25700	
20...	1205	16100	1.0	810	18...	0925	27900	
28...	1350	12900	2.0	700	21...	1415	26700	
MAR				28...	1120	27200	26.5	
05...	1230	11000	2.0	740	SEP			
12...	1300	10500	5.0	825	05...	1350	31000	
19...	1700	10000	6.0	790	12...	1215	31200	
26...	1235	11700	5.0	740	17...	1500	31900	
APR				27...	1335	30300	18.0	
04...	1540	23400	9.0	770				
13...	1040	25100	7.0	805				
16...	1730	26500	9.0	760				

06602020 WEST FORK DITCH AT HORNICK, IA (LAT 42 13 37N LONG 096 04 40W)

OCT 1989					MAY 1990				
24...	1505	20	20.0	590	15...	1150	38	14.0	690
26...	1505	20	20.0	590	19...	2000	2520	14.0	206
JAN 1990					JUN				
08...	1300	19	0.0	720	22...	0915	177	19.0	750
FEB					JUL				
26...	1130	19	0.0	715	31...	1455	75	25.0	710
MAR					SEP				
29...	1400	27	7.0	690	20...	0900	34	15.0	690

06602400 MONONA-HARRISON DITCH NEAR TURIN, IA (LAT 41 57 52N LONG 095 59 30W)

OCT 1989						APR 1990				
09...	1315	42	5.0	710		25...	1430	83	20.0	700
NOV						MAY				
09...	1315	42	5.0	710		20...	1545	2280	14.0	225
JAN 1990						21...	1520	618	15.0	400
31...	1700	59	3.0	700		23...	1820	5820	17.0	240
MAR										
12...	1715	121	10.0	600						

MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	DIS- CHARGE, INST CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
06605000 OCHEYEDAN RIVER NEAR SPENCER, IA (LAT 43 07 44N LONG 095 12 37W)									
OCT 1989 12...	0845	7.6	16.0	640	MAY 1990 09...	0910	25	10.0	650
NOV 20...	1315	8.2	0.0	760	JUN 12...	0645	67	24.0	730
JAN 1990 02...	1300	--	0.0	1000	AUG 01...	1735	77	21.0	880
FEB 12...	1420	5.1	2.0	605	SEP 19...	0840	20	13.0	670
MAR 27...	1830	27	9.0	830					
06605850 LITTLE SIOUX RIVER AT LINN GROVE, IA (LAT 42 53 24N LONG 095 14 30W)									
OCT 1989 11...	1710	19	17.0	940	MAY 1990 09...	1055	96	15.0	800
NOV 15...	1230	26	5.0	890	JUN 11...	1630	270	26.0	820
JAN 1990 02...	1420	5.3	3.0	1100	AUG 01...	1240	532	18.0	650
FEB 12...	1605	16	4.0	805	SEP 20...	0900	62	14.0	720
MAR 27...	1600	115	8.0	780					
06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IA (LAT 42 28 20N LONG 095 47 49W)									
OCT 1989 02...	1645	42	15.0	970	MAY 1990 16...	1445	356	16.0	710
25...	1130	50	13.5	880	19...	1650	2400	14.0	390
JAN 1990 10...	1405	30	0.0	1020	JUN 19...	1715	2400	14.0	390
FEB 22...	1315	51	0.0	920	JUL 14...	1045	788	23.5	622
MAR 16...	1300	264	4.0	575	31...	1015	962	24.0	700
28...	1315	221	7.5	710	SEP 20...	1445	146	17.5	750
06607200 MAPLE RIVER AT MAPLETON, IA (LAT 42 09 28N LONG 095 48 27W)									
OCT 1989 02...	1515	44	16.5	680	MAY 1990 19...	0945	5880	14.0	275
25...	1415	47	18.0	710	19...	1050	5320	14.0	275
JAN 1990 11...	1300	35	0.0	810	JUN 13...	1915	4960	21.5	242
FEB 27...	1210	47	2.0	710	18...	1245	2670	22.0	420
MAR 16...	1105	150	4.0	680	JUL 31...	1245	513	24.0	660
30...	1240	143	10.0	750	SEP 20...	1130	141	16.5	700
06607500 LITTLE SIOUX RIVER NEAR TURIN, IA (LAT 41 57 52N LONG 095 58 21W)									
NOV 1989 09...	1115	146	3.0	720	JUN 1990 07...	1500	1430	20.0	675
MAR 1990 12...	1500	397	14.0	600	JUL 18...	1100	954	29.0	690
APR 25...	1230	253	18.0	725	SEP 05...	1450	525	28.5	636
MAY 20...	1240	5280	13.0	294					
21...	1245	2050	20.0	525					
06608500 SOLDIER RIVER AT PISGAH, IA (LAT 41 49 52N LONG 095 55 50W)									
NOV 1989 07...	1425	33	5.0	700	JUN 1990 07...	0900	98	20.0	900
08...	1425	33	5.0	700	JUL 17...	1030	109	29.0	650
DEC 27...	1230	17	0.0	950	SEP 06...	1200	70	25.0	689
JAN 1990 30...	1100	21	0.0	1000					
MAR 14...	1450	279	11.0	410					

MISCELLANEOUS WATER-QUALITY DATA

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
06609500 BOYER RIVER AT LOGAN, IA (LAT 41 38 33N LONG 095 46 57W)									
OCT 1989 02...	1245	2550	13.5	630	MAR 1990 01...	1115	58	2.0	805
NOV 08...	1200	60	4.0	680	06...	1530	82	2.0	850
DEC 15...	1230	25	0.0	900	14...	1200	2100	11.0	300
26...	1045	24	-1.0	1000	16...	0900	461	5.0	540
JAN 1990 11...	1430	38	0.0	800	APR 24...	1130	128	20.0	650
17...	1530	75	0.0	925	MAY 10...	1550	294	15.0	533
24...	1500	69	1.0	900	19...	1515	18300	15.0	150
30...	1300	82	0.0	975	20...	1355	1520	13.5	340
FEB 08...	1440	92	1.0	1000	JUN 12...	1350	403	22.0	760
16...	1300	81	0.0	950	13...	1700	19100	21.0	200
21...	1045	65	0.0	875	JUL 17...	1415	505	29.0	675
					SEP 06...	1520	255	28.5	680
06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IA (LAT 41 23 24N LONG 095 22 17W)									
OCT 1989 24...	1500	140	13.0	631	APR 1990 23...	1745	159	18.0	700
DEC 19...	1100	--	0.0	850	JUN 05...	1115	322	15.0	625
JAN 1990 29...	1500	95	1.0	900	JUL 19...	1040	344	29.0	675
MAR 19...	1115	440	4.0	625	AUG 31...	1255	235	24.5	621
06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IA (LAT 40 52 23N LONG 095 34 48W)									
OCT 1989 03...	1300	301	13.0	645	MAY 1990 08...	1045	251	16.0	615
NOV 21...	1630	230	3.0	600	JUN 14...	1450	5360	20.0	250
JAN 1990 02...	1630	153	1.0	700	20...	1015	2450	22.0	475
FEB 22...	1530	177	2.0	610	AUG 16...	1140	864	23.0	605
MAR 28...	1015	411	7.0	600	SEP 28...	1115	280	17.0	568
06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IA (LAT 41 20 47N LONG 095 04 31W)									
OCT 1989 24...	1300	84	12.0	578	MAR 1990 16...	1230	658	6.0	425
NOV 07...	1215	75	5.0	585	APR 23...	0900	117	12.0	900
DEC 19...	1500	32	0.0	900	JUN 05...	1500	245	18.0	700
JAN 1990 29...	1145	37	2.0	850	JUL 19...	1400	703	29.0	450
06809500 EAST NISHNABOTNA RIVER NEAR RED OAK, IA (LAT 41 00 41N LONG 095 14 07W)									
OCT 1989 05...	1220	223	14.0	545	JAN 1990 16...	1000	116	1.0	700
NOV 13...	1330	1170	10.0	540	23...	1500	120	2.0	750
29...	1100	53	0.0	575	30...	1415	123	1.0	575
DEC 08...	1115	79	0.0	525	FEB 07...	1440	124	3.0	760
20...	1440	73	0.0	600	14...	1330	54	1.0	825
28...	1140	85	0.0	950	20...	1200	130	1.0	550
JAN 1990 03...	1005	133	0.0	645	MAR 02...	1200	106	2.0	600
					28...	1330	388	7.0	495
06811840 TARKIO RIVER AT STANTON, IA (LAT 40 58 52N LONG 095 06 32W)									
OCT 1989 04...	1825	5.3	12.0	460	MAY 1990 10...	1820	15	12.0	425
NOV 13...	1000	4.5	10.0	500	JUN 19...	1320	43	19.0	455
JAN 1990 05...	1315	3.5	0.0	560	AUG 10...	1030	15	21.0	480
FEB 20...	1410	2.1	1.0	550	SEP 24...	1530	2.5	15.0	499
MAR 27...	1620	16	6.0	450					

MISCELLANEOUS WATER-QUALITY DATA

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DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
06813500 MISSOURI RIVER AT RULO, NE (LAT 40 03 14N LONG 095 25 12W)									
OCT 1989					APR 1990				
03...	1310	34600	18.0	750	11...	0850	31100	9.0	750
26...	1300	34500	15.0	800	18...	1250	34500	10.0	800
31...	1605	29900	13.0	775	23...	1100	32100	16.0	805
NOV					MAY				
07...	1015	21100	10.0	780	03...	1200	32600	14.0	800
14...	1230	17500	10.0	800	10...	1230	34600	15.0	700
22...	1230	17100	3.0	800	25...	1400	47300	15.0	525
DEC					JUN				
01...	1220	16000	1.0	850	01...	1215	35600	20.0	730
06...	1215	16400	2.0	800	08...	1125	40900	20.0	700
JAN 1990					26...	1130	51200	26.0	650
05...	1330	17600	1.0	860	JUL				
10...	1350	17500	3.0	900	05...	1110	40600	29.0	750
18...	1415	22000	2.0	790	13...	1315	35600	30.0	775
25...	1400	18300	2.0	750	20...	1145	34700	27.0	740
FEB					24...	1300	37000	28.0	700
01...	1300	20300	3.0	775	AUG				
08...	1215	19600	5.0	760	01...	1215	47800	26.5	599
22...	1340	20000	3.0	800	06...	1625	37300	25.5	680
MAR					15...	1130	38200	25.0	715
01...	1100	20700	4.0	800	22...	0640	35300	26.0	750
08...	1345	17900	6.0	800	28...	0740	36000	27.0	740
16...	1315	27300	9.0	615	SEP				
22...	1030	18000	9.0	700	05...	1240	33700	27.5	760
29...	1315	20700	9.0	750	12...	0940	35000	26.0	760
APR					17...	1230	34800	23.0	790
06...	1245	30400	12.0	875	26...	1135	34100	19.0	810
06818750 PLATTE RIVER NEAR DIAGONAL, IA (LAT 40 46 02N LONG 094 24 46W)									
OCT 1989					MAY 1990				
04...	1510	11	12.0	450	09...	1315	47	15.0	425
NOV					JUN				
16...	1650	11	2.0	450	21...	1900	146	21.0	370
JAN 1990					AUG				
03...	1605	6.4	0.0	690	09...	1200	15	21.0	430
FEB					SEP				
21...	1715	15	1.0	525	26...	1740	4.7	19.0	440
MAR									
29...	0840	139	5.0	380					
06819185 EAST FORK 102 RIVER AT BEDFORD, IA (LAT 40 39 40N LONG 094 42 58W)									
OCT 1989					MAY 1990				
03...	1750	0.27	15.0	460	10...	1500	24	14.0	400
NOV					25...	1200	2300	15.5	210
17...	0930	2.5	3.0	475	JUN				
JAN 1990					20...	1500	78	23.5	360
03...	1410	1.4	3.0	610	AUG				
30...	1140	3.0	2.0	500	09...	1530	5.3	25.0	430
FEB					SEP				
20...	1700	4.5	2.0	450	27...	1300	0.47	20.0	562
MAR									
14...	1520	1250	11.0	220					
28...	1715	35	8.0	420					
06898000 THOMPSON RIVER AT DAVIS CITY, IA (LAT 40 38 25N LONG 093 48 29W)									
OCT 1989					MAY 1990				
04...	1150	15	12.0	540	09...	1050	595	15.0	390
NOV					JUN				
16...	1420	17	3.0	575	21...	1300	1040	22.0	325
JAN 1990					JUL				
04...	1245	19	0.0	640	20...	1800	12800	23.0	150
FEB					AUG				
21...	1215	32	1.0	500	08...	1520	98	24.0	440
MAR					SEP				
29...	1400	201	7.0	495	26...	0845	20	16.0	584
06898400 WELDON RIVER NEAR LEON, IA (LAT 40 41 45N LONG 093 38 07W)									
OCT 1989					MAY 1990				
04...	0910	0.24	10.0	555	10...	1000	153	9.0	300
NOV					25...	1910	3320	62.5	144
16...	0815	0.24	1.0	525	26...	1020	269	17.0	250
JAN 1990					JUN				
04...	1045	4.3	0.0	540	21...	0940	72	19.0	320
FEB					AUG				
21...	1000	2.9	1.0	560	08...	1820	4.7	25.0	540
MAR									
29...	1620	47	6.0	500					

MISCELLANEOUS WATER-QUALITY DATA

DATE	TIME	DIS- CHARGE, INST CUBIC FEET SECOND (00061)	SPE- CIFIC TEMPER- ATURE (DEG C) (00010)	CON- DUCT- ANCE (US/CM) (00095)	DATE	TIME	DIS- CHARGE, INST CUBIC FEET SECOND (00061)	SPE- CIFIC TEMPER- ATURE (DEG C) (00010)	CON- DUCT- ANCE (US/CM) (00095)
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06903400 CHARITON RIVER NEAR CHARITON, IA (LAT 40 57 06N LONG 093 15 34W)

OCT 1989					JUN 1990				
02..	1545	0.09	14.0	262	05...	0905	13	16.0	395
JAN 1990					JUL				
29...	1355	4.7	0.5	343	10...	0900	13	24.0	357
MAR					AUG				
12...	1530	282	13.0	352	29...	0950	3.1	25.0	230
APR					SEP				
24...	1725	15	22.0	528	25...	1020	0.73	14.0	291
MAY									
26...	1125	2370	18.0	128					

06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IA (LAT 40 48 02N LONG 093 11 32

NOV 1989					JUN 1990				
06...	1520	0.36	8.0	425	05...	1138	14	--	489
JAN 1990					JUL				
30...	0945	5.1	0.5	459	10...	1045	291	25.0	190
MAR					AUG				
13...	0855	95	14.0	388	30...	1040	28	22.0	383
MAY					SEP				
26...	1300	524	17.0	270	25...	1330	35	19.0	494

06903900 CHARITON RIVER NEAR RATHBUN, IA (LAT 40 49 22N LONG 092 53 22W)

OCT 1989					APR 1990				
03...	1150	11	--	296	25...	1255	13	13.0	291
NOV					JUN				
07...	1015	11	10.0	300	05...	1445	507	16.0	307
DEC					JUL				
19...	0910	8.8	20.0	291	10...	1215	8.4	21.0	259
JAN 1990					AUG				
30...	1235	12	5.0	307	30...	1425	1140	26.0	264
MAR					SEP				
13...	1108	14	6.0	301	21...	1050	777	22.0	255

06904010 CHARITON RIVER NEAR MOULTON, IA (LAT 40 41 30N LONG 092 46 15W)

OCT 1989					JUN 1990				
03...	1547	25	16.0	371	06...	0935	540	16.0	299
NOV					JUL				
07...	1345	23	10.0	400	10...	1505	470	23.0	403
JAN 1990					AUG				
30...	1517	37	2.0	463	30...	1850	1220	24.0	282
MAR					SEP				
13...	1435	252	15.0	379	18...	1405	827	23.0	460
APR									
25...	1550	37	25.0	570					

AUDUBON COUNTY

413044094565601. Local number, 78-36-35 ADCC1.

LOCATION.--Lat $41^{\circ}30'44''$, long $94^{\circ}56'56''$, Hydrologic Unit 10240003, 2.5 mi south of the Town of Brayton on Hwy 71, and 0.3 mi west on the north side of County Road F-67. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 115 ft, cased to 115 ft, slotted from 94-101 ft, gravel-packed.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,230 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.15 ft above land-surface datum.

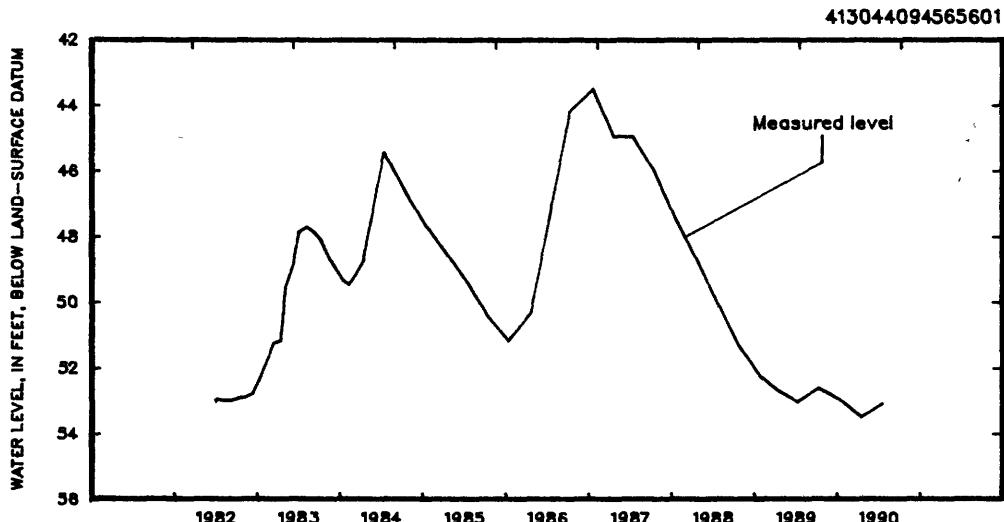
REMARKS.--Well WC-69.

PERIOD OF RECORD.--June 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 43.55 ft below land-surface datum, January 14, 1987; lowest measured, 53.55 ft below land-surface datum, April 12, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	52.65	JAN 12	53.04	APR 12	53.55	JUL 13	50.97
WATER YEAR 1990	HIGHEST	50.97	JUL 13, 1990	LOWEST	53.55	APR 12, 1990	



413958094544501. Local number, 79-35-10 CABB.

LOCATION.--Lat $41^{\circ}39'58''$, long $94^{\circ}54'45''$, Hydrologic Unit 10240003, approximately 0.3 mi west of the Town of Hamlin, on the south side of Highway 44. Owner: Geological Survey Bureau/DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 221 ft, cased to 210 ft, slotted from 168-188 ft, open hole 210-221 ft, gravel-packed..

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,280 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.70 ft above land-surface datum.

REMARKS.--Well WC-17.

PERIOD OF RECORD.--August 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 35.60 ft below land-surface datum, April 15, 1987; lowest measured, 41.87 ft below land-surface datum, July 13, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	39.44	JAN 12	38.89	APR 12	39.50	JUL 13	38.18
WATER YEAR 1990	HIGHEST	38.18	JUL 13, 1990	LOWEST	39.50	APR 12, 1990	

GROUND-WATER LEVELS

AUDUBON COUNTY

413843094541701. Local number, 79-35-15 DCDD.

LOCATION.--Lat $41^{\circ}38'43''$, long $94^{\circ}54'17''$, Hydrologic Unit 10240003, approximately 1.5 mi south of the Town of Hamlin and 0.5 mi west of Highway 71. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--East Nishnabotna alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 32 ft, cased to 30 ft, slotted from 25-30 ft, open hole 30-32 ft, gravel-packed.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,245 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.50 ft above land-surface datum.

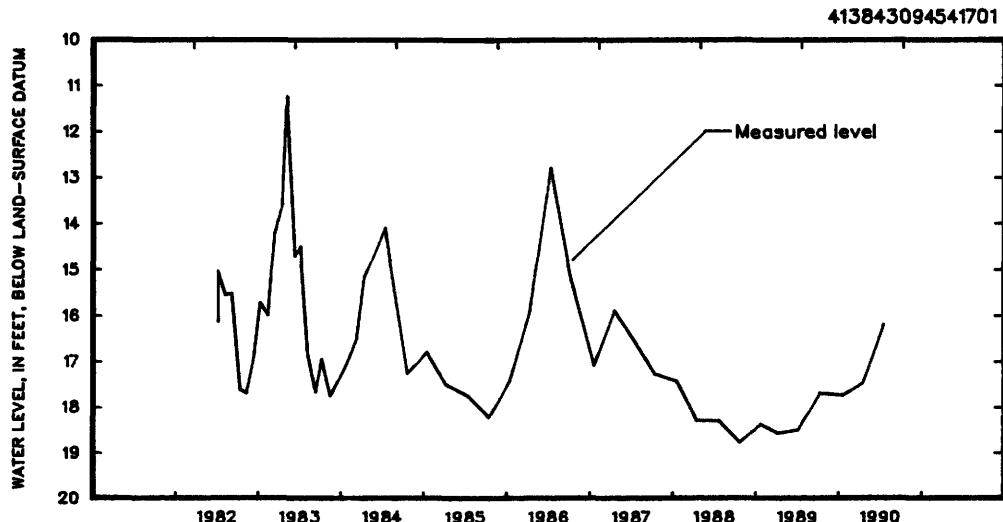
REMARKS.--Well WC-75

PERIOD OF RECORD.--June 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.28 ft below land-surface datum, May 3, 1983; lowest measured, 18.81 ft below land-surface datum, October 19, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	17.72	JAN 12	17.79	APR 12	17.50	JUL 13	14.73
WATER YEAR 1990	HIGHEST	14.73	JUL 13, 1990	LOWEST	17.79	JAN 12, 1990	



415023094593801. Local number, 81-36-12 CBCA

LOCATION.--Lat $41^{\circ}50'23''$, long $94^{\circ}59'38''$, Hydrologic Unit 10240002, approximately 0.5 mi west of the Town of Gray on the east side of County Road N-14, south of the Gray Cemetery. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 315 ft, cased to 315 ft, slotted from 279-295 ft, gravel-packed.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,393 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.

REMARKS.--Well WC-18.

PERIOD OF RECORD.--August 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 160.59 ft below land-surface datum, October 2, 1989; lowest measured, 168.52 ft below land-surface datum, October 6, 1987.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	160.59	FEB 13	161.10	APR 16	161.31	JUL 10	161.24
WATER YEAR 1990	HIGHEST	161.10	FEB 13, 1990	LOWEST	161.31	APR 16, 1990	

GROUND-WATER LEVELS

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BENTON COUNTY

415211092164101. Local number, 82-12-31 DAAD1.

LOCATION.--Lat 41°52'11", long 92°16'41", Hydrologic Unit 07080208, approximately 0.6 mi north of the Iowa River, west side of Iowa Highways 21 and 212, approximately 1.2 mi south of the Town of Belle Plaine. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Iowa alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 26 ft, cased to 23 ft, screen 23 to 26 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 770 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3 ft above land-surface datum.

REMARKS.--Well IRA-16A.

PERIOD OF RECORD.--October 1984 to current year.
EXTREMES FOR PERIOD OF RECORD: Wind speeds

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.52 ft below land-surface datum, May 28, 1986; lowest measured, 7.50 ft below land-surface datum, October 6, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	5.00	JAN 26	5.83	APR 30	3.47	JUN 15	2.95
NOV 27	5.29	MAR 28	2.88	JUN 07	3.01	AUG 20	1.67
DEC 27	5.81						
WATER YEAR 1990		HIGHEST	1.67	AUG 20, 1990	LOWEST	5.83	JAN 26, 1990

WATER YEAR 1990 HIGHEST 1.67 AUG 20, 1990 LOWEST 5.83 JAN 26, 1990

415211092164102. Local number, 82-12-31 DAAD2.

LOCATION.--Lat 41°52'11", long 92°16'41", Hydrologic Unit 07080208, approximately 0.6 mi north of the Iowa River, west side of Iowa Highways 21 and 212, approximately 1.2 mi south of the Town of Belle Plaine. Owner: Geological Survey Bureau, DNR and U. S. Geological Survey.

AQUIFER--Iowa alluvial; in sand and gravel of Holocene age.

AQUIFER.--Iowa alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 15 ft, cased to 12 ft, slotted 12 to 15 ft.

METHOD.—Monthly measure

DATUM.--Elevation of land-surface datum is 770 ft above National Geodetic Vertical Datum.

REMARKS.--Well IRA-16B.

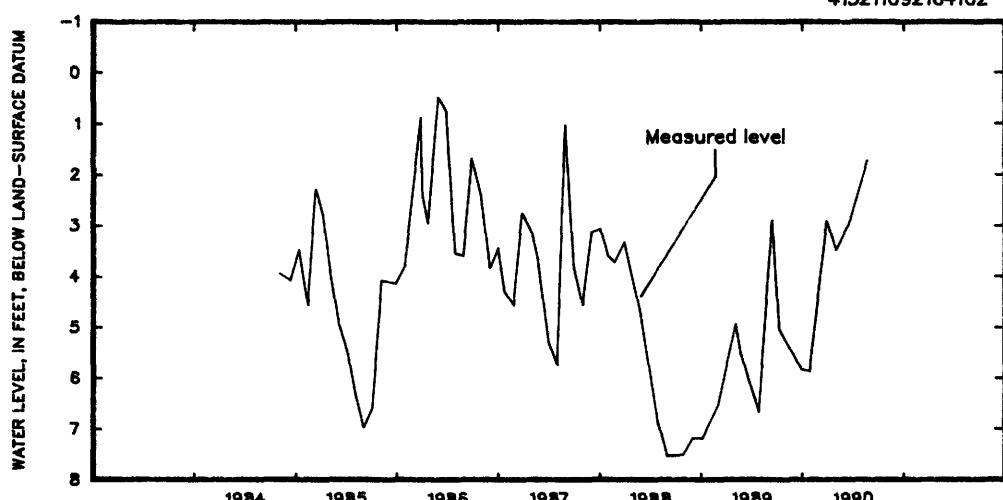
PERIOD OF RECORD.--October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.48 ft below land-surface datum, May 28, 1986; lowest measured, 7.54 ft below land-surface datum, August 29, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	5.07	JAN 26	5.88	APR 30	3.49	JUN 15	2.98
DEC 27	5.84	MAR 28	2.91	JUN 07	3.05	AUG 20	1.71
WATER YEAR 1990		HIGHEST	1.71	AUG 20, 1990	LOWEST	5.88	JAN 26, 1990

WATER YEAR 1990 HIGHEST 1.71 AUG 20, 1990 LOWEST 5.88 JAN 26, 1990



GROUND-WATER LEVELS

BENTON COUNTY

420459091500201. Local number, 84-09-13 DADD1.

LOCATION.--Lat 42° 04' 56", long 91° 50' 02", Hydrologic Unit 07080205, approximately 1.75 mi southeast of the Town of Shellsburg, north of the Chicago, Rock Island and Pacific Railroad tracks. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian and limestone of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5", depth 421 ft, cased to 35 ft and 163.5-184 ft, open hole 35-163.5 ft and 184-421 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 753 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.23 ft above land-surface datum.

REMARKS.--Shellsburg Quarry/Flood Hole. Records for November 1975 to September 1988 are on file in the Iowa District Office.

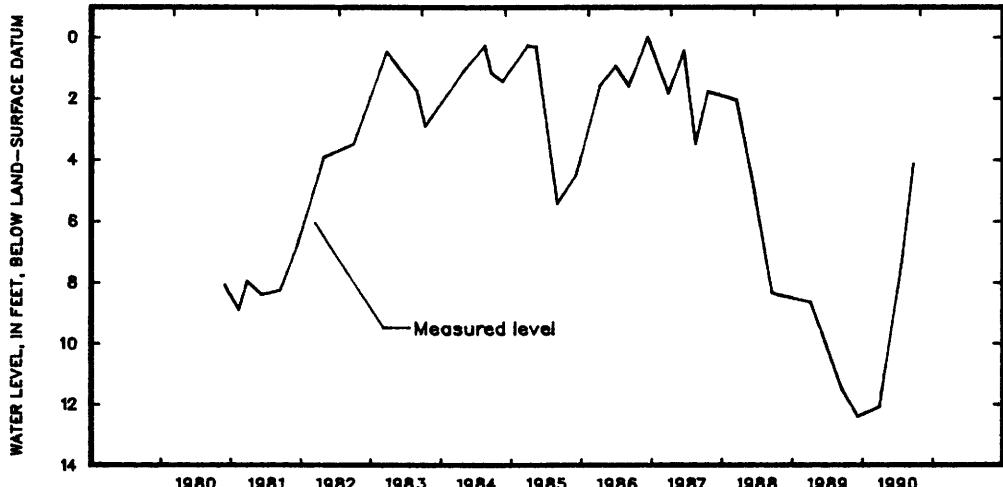
PERIOD OF RECORD.--November 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, +0.65 ft above land-surface datum, April 3, 1979; lowest measured, 12.47 ft below land-surface datum, December 1, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	12.47	MAR 26	12.12	JUL 17	7.41	SEP 17	4.18
WATER YEAR 1990	HIGHEST		4.18	SEP 17, 1990	LOWEST	12.47	DEC 01, 1989

420459091500201



420319091540102. Local number, 84-09-28 DBCC2.

LOCATION.--Lat 42° 03' 19", long 91° 54' 01", Hydrologic Unit 07080205, approximately 3 mi south and 1.5 mi west of the Town of Shellsburg. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 7 in. to 173 ft, 5 in. to 590 ft, depth 590 ft, cased to 260 ft, open hole 265-590 ft. Cement plug 260-265 ft. Well open to 59.7 ft of Devonian rock reported to yield little, if any, water.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 915 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.28 ft above land-surface datum.

REMARKS.--Parker's Grove Cemetery well.

PERIOD OF RECORD.--April 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 150.73 ft below land-surface datum, April 14, 1975; lowest measured, 167.63 ft below land-surface datum, September 11, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	168.21	MAR 26	169.18	JUL 17	165.04	SEP 17	162.07
WATER YEAR 1990	HIGHEST	162.07	SEP 17, 1990	LOWEST	169.18	MAR 26, 1990	

BENTON COUNTY

420731092083801. Local number, 85-11-33 CCBC1.

LOCATION.--Lat 42°07'31", long 92°08'38", Hydrologic Unit 07080205, approximately 1 mi south of the Town of Garrison, just east of County Road V-56. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Devonian: in Cedar Valley limestone of Middle Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 0.75 in., depth 237 ft, cased to 170 ft, slotted below cement plug, open hole 170 to 237 ft. Cement plugs from 97-100 ft and 237-240 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 905 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of 6 in. casing, 2.20 ft above land-surface datum.

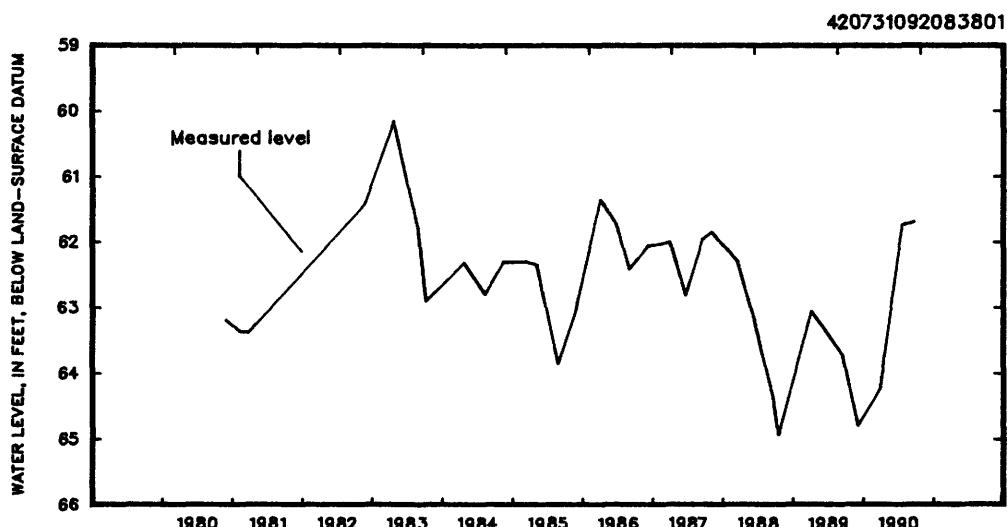
REMARKS.--Garrison 170 well.

PERIOD OF RECORD.--June 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 60.18 ft below land-surface datum, April 19, 1983; lowest measured, 64.96 ft below land-surface datum, October 12, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	64.82	MAR 26	64.24	JUL 17	61.76	SEP 17	61.71
WATER YEAR 1990	HIGHEST	61.71	SEP 17, 1990	LOWEST	64.82	DEC 01, 1989	



420731092083803. Local number, 85-11-33 CCBC3.

LOCATION.--Lat 42°07'31", long 92°08'38", Hydrologic Unit 07080205, approximately 1 mi south of the Town of Garrison, just east of County Road V-56. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Devonian: in Cedar Valley limestone of Middle Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 97 ft, cased to 90 ft, open hole 90 to 97 ft. Cement plug from 97-100 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 905 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of 6 in. casing, 2.20 ft above land-surface datum.

REMARKS.--Garrison 109 well.

PERIOD OF RECORD.--June 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 60.63 ft below land-surface datum, March 23, 1979; lowest measured, 65.03 ft below land-surface datum, October 12, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	64.92	MAR 26	64.30	JUL 17	61.80	SEP 17	61.76
WATER YEAR 1990	HIGHEST	61.76	SEP 17, 1990	LOWEST	64.92	DEC 01, 1989	

GROUND-WATER LEVELS

BENTON COUNTY

421326091522701. Local number, 86-09-34 AAAD1.

LOCATION.--Lat 42°13'29", long 91°52'19", Hydrologic Unit 07080205, next to the water tower in the Town of Urbana. Owner: Town of Urbana.

AQUIFER.--Ordovician and Silurian-Devonian: open from limestone and dolomite of the Platteville formation into limestone of Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 1,033 ft, cased to 142 ft, open hole 142-1,033 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 940 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 3.15 ft above land-surface datum.

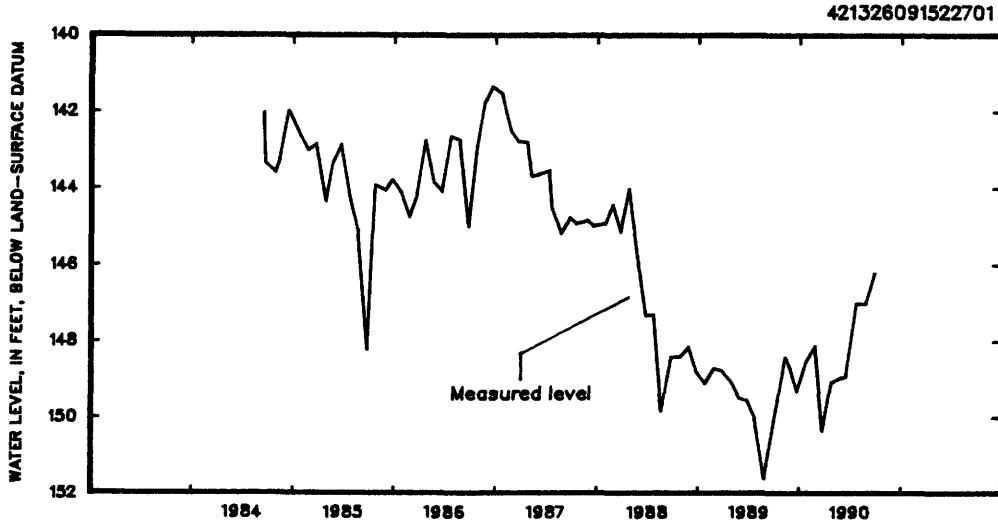
REMARKS.--None.

PERIOD OF RECORD.--September 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 141.37 ft below land-surface datum, December 17, 1986; lowest measured, 151.64 ft below land-surface datum, August 24, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 09	148.44	JAN 23	148.53	APR 24	149.09	JUL 23	147.02
24	148.73	FEB 23	148.14	MAY 16	149.00	AUG 24	147.02
DEC 19	149.34	MAR 22	150.37	JUN 14	148.93	SEP 26	146.22
WATER YEAR 1990		HIGHEST 146.22 SEP 26, 1990				LOWEST 150.37 MAR 22, 1990	



BUENA VISTA COUNTY

423618095194511. Local number, 90-38-16 DDDDD11.

LOCATION.--Lat 42°36'18", long 95°19'45", Hydrologic Unit 10230005, north of County Highway C-65, 2 mi east of the Village of Hanover. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 497 ft, cased to 497 ft, perforated 346.5-349.5 ft.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,365 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.50 ft above land-surface datum.

REMARKS.--Well D-25.

PERIOD OF RECORD.--April 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 187.17 ft below land-surface datum, August 12, 1988; lowest measured, 189.53 ft below land-surface datum, December 6, 1983.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	188.56	MAR 29	188.96	JUN 11	189.17	SEP 20	189.47
WATER YEAR 1990		HIGHEST 188.56 NOV 16, 1989				LOWEST 189.47 SEP 20, 1990	

BUENA VISTA COUNTY

424023095571401. Local number, 91-35-26 BCCC1.

LOCATION.--Lat 42°40'23", long 94°57'14", Hydrologic Unit 07100006, approximately 2.7 mi west and 0.5 mi north of the Village of Varina. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 357 ft, cased to 357 ft, perforated 338-347 ft. Paleozoic rock present at 347 ft.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,291 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

REMARKS.--Well D-24.

PERIOD OF RECORD.--December 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.40 ft below land-surface datum, January 7, 1980; lowest measured, 61.84 ft below land-surface datum, September 18, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 20	59.52	MAR 29	60.55	JUN 11	61.12	SEP 18	61.84
WATER YEAR 1990	HIGHEST	59.52	NOV 20, 1989	LOWEST	61.84	SEP 18, 1990	

425233094545001. Local number, 93-35-13 ADAA1.

LOCATION.--Lat 42°52'33", long 94°54'50", Hydrologic Unit 07100006, south of the Chicago, Rock Island and Pacific Railroad track, approximately 3.5 mi east and 0.75 mi north of the Town of Marathon. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 1.50 in., depth 381 ft, cased to 381 ft, perforated 350-360 ft.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,330 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.00 ft above land-surface datum.

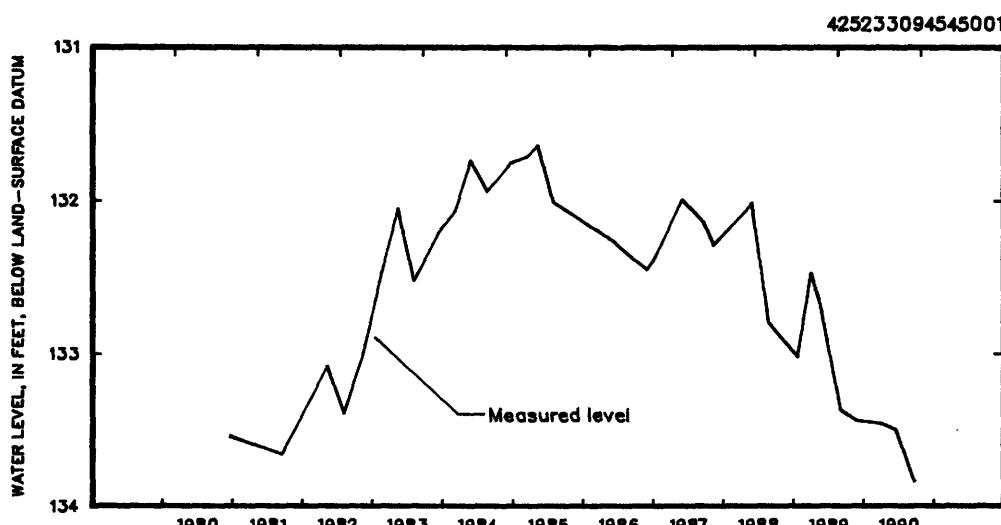
REMARKS.--Well D-36.

PERIOD OF RECORD.--February 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 131.65 ft below land-surface datum, May 6, 1985; lowest measured, 133.85 ft below land-surface datum, September 18, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 20	133.45	MAR 29	133.47	JUN 12	133.51	SEP 18	133.85
WATER YEAR 1990	HIGHEST	133.45	NOV 20, 1989	LOWEST	133.85	SEP 18, 1990	



GROUND-WATER LEVELS

CALHOUN COUNTY

422812094383501. Local number, 88-33-01 BACD.

LOCATION.--Lat $42^{\circ}28'12''$, long $94^{\circ}38'35''$, Hydrologic Unit 07100006, located approximately 4.5 mi north of Rockwell City, in a trailer park at the south end of North Twin Lake in Twin Lakes State Park. Owner: Pauline Goins.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Dug unused water-table well, diameter 24 in., depth 35 ft, casing interval unknown.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,222 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.12 ft above land-surface datum.

REMARKS.--Twin Lakes (33F2) well.

PERIOD OF RECORD.--May 1989 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.34 ft below land-surface datum, June 21, 1990; lowest measured, 16.96 ft below land-surface datum, February 28, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 15, 1989	10.39	NOV 17, 1989	16.45	JUN 21, 1990	4.34	DEC 18, 1990	9.34
JUN 19	11.24	DEC 27	16.21	JUL 19	7.00	JAN 22, 1991	10.52
JUL 26	12.86	FEB 28, 1990	16.96	AUG 20	7.19	FEB 21	9.28
AUG 30	14.47	MAR 27	13.36	SEP 18	8.70		
SEP 20	14.02	MAY 02	10.50	OCT 23	9.94		
OCT 25	14.72	31	4.51	NOV 14	9.90		

WATER YEAR 1990 HIGHEST 4.34 JUN 21, 1990 LOWEST 16.96 FEB 28, 1990

CARROLL COUNTY

420705094394501. Local number, 84-33-02 BDBA1.

LOCATION.--Lat $42^{\circ}07'05''$, long $94^{\circ}39'45''$, Hydrologic Unit 07100006, 3.75 mi north and 3.25 mi east of the Town of Glidden, east of County Road N-50 and the Kendal Bridge. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., cased to 76 ft, slotted from 73-76 ft.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,110 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

REMARKS.--Well WC-132.

PERIOD OF RECORD.--September 1982 to current year.

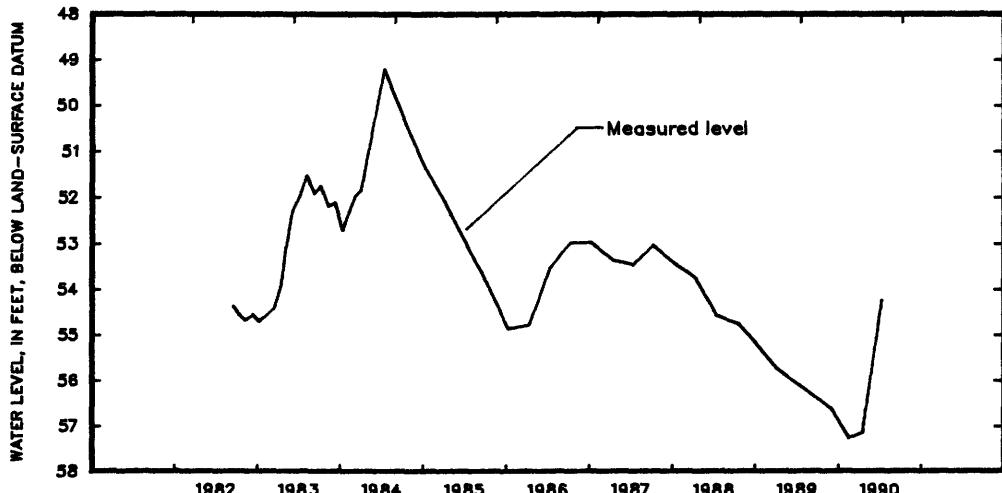
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 49.24 ft below land-surface datum, July 12, 1984; lowest measured, 57.30 ft below land-surface datum, February 13, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	56.66	FEB 13	57.30	APR 16	57.16	JUL 10	54.26

WATER YEAR 1990 HIGHEST 54.26 JUL 10, 1990 LOWEST 57.30 FEB 13, 1990

420705094394501



CARROLL COUNTY

420643094403701. Local number, 84-33-03 CADA1.

LOCATION.--Lat 42°06'43", long 94°40'37", Hydrologic Unit 07100006, 3.5 mi north and 2.5 mi east of the Town of Glidden, on the west side of County Road N-50. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--North Raccoon terrace: in terrace sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 21 ft, cased to 15 ft, slotted from 13-15 ft, gravel-packed. Glacial till penetrated 15-21 ft.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.31 ft above land-surface datum.

REMARKS.--Well WC-131.

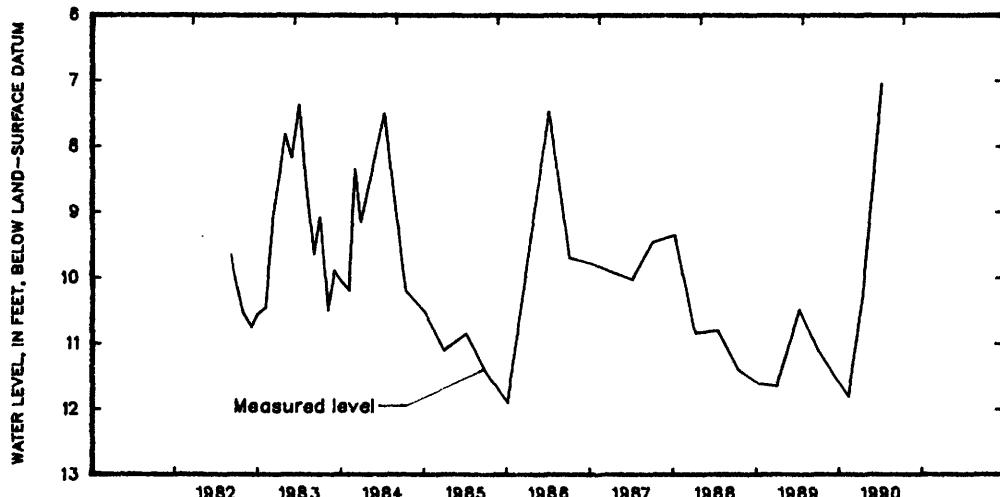
PERIOD OF RECORD.--September 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.06 ft below land-surface datum, July 10, 1990; lowest measured, 11.92 ft below land-surface datum, January 7, 1986.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	11.13	FEB 13	11.83	APR 16	10.35	JUL 10	7.06
WATER YEAR 1990	HIGHEST		7.06	JUL 10, 1990	LOWEST	11.83	FEB 13, 1990

420643094403701



420233094475901. Local number, 83-35-34 BCDC1.

LOCATION.--Lat 42°02'33", long 94°47'59", Hydrologic Unit 07100007, approximately 3.5 mi west and 1.5 mi south of the Town of Glidden near the airport, west of County Road N-38. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 100 ft, cased to 99 ft, slotted from 72-76 ft; gravel packed, open hole 99-100 ft. Pennsylvanian rock 80-100 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,225 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.40 ft above land-surface datum.

REMARKS.--Well WC-148.

PERIOD OF RECORD.--October 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.56 ft below land-surface datum, May 4, 1983; lowest measured, 21.54 ft below land-surface datum, April 3, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	20.73	FEB 13	21.21	APR 16	18.68	JUL 10	15.89
WATER YEAR 1990	HIGHEST		15.89	JUL 10, 1990	LOWEST	21.21	FEB 13, 1990

GROUND-WATER LEVELS

CARROLL COUNTY

420335094521501. Local number, 84-35-25 BDAD1.
 LOCATION.--Lat 42°03'35", long 94°52'15", Hydrologic Unit 07100007, near the city water plant, Carroll.
 Owner: City of Carroll.
 AQUIFER.--Dakota: in sandstone of Cretaceous age.
 WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 120 ft, cased to 100 ft, open hole 100-120 ft.
 METHOD.--Intermittent measurement reported by personnel from the City of Carroll.
 DATUM.--Elevation of land-surface datum is 1,275 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.
 REMARKS.--City test No. 1. Water levels affected by pumping of nearby wells.
 PERIOD OF RECORD.--September 1939 to December 1949, May 1952 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 34.55 ft below land-surface datum, September 8, 1945; lowest measured, 87.50 ft below land-surface datum, June 13, 1981.
 REVISION.--Lowest water level measured, 87.50 ft below land-surface datum, Jun. 13, 1981.

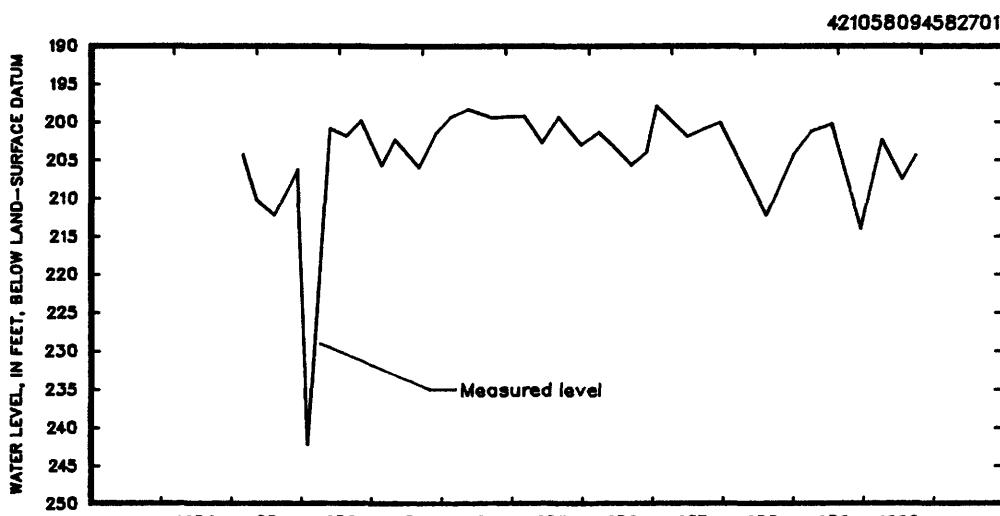
WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
APR 17	70.32	MAY 29	73.32	JUL 24	70.54	SEP 04	72.76
23	71.41	JUN 06	74.64	31	69.14	11	72.70
MAY 01	73.83	26	73.08	AUG 07	70.52	18	72.62
08	73.55	JUL 03	75.29	14	70.69	25	71.75
15	73.19	10	72.61	21	71.15		
22	74.10	17	73.00	28	71.06		
WATER YEAR 1990		HIGHEST	69.14	JUL 31, 1990		LOWEST	75.29 JUL 03, 1990

421058094582701. Local number, 85-35-07 CCCC1.
 LOCATION.--Lat 42°10'58", long 94°58'27", Hydrologic Unit 07100006, approximately 1 block north of Iowa Highway 217, next to the town maintenance building, Breda. Owner: Town of Breda.
 AQUIFER.--Dakota: in sandstone of Cretaceous age.
 WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 10 in., depth 340 ft, cased to 320 ft, screen 320-340 ft. Original depth 349 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,362 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Vent pipe, 1.60 ft above land-surface datum.
 REMARKS.--Town well No. 3. Water levels affected by pumping.
 PERIOD OF RECORD.--March 1942 to August 1966, March 1968 to November 1971, June 1975 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 187.70 ft below land-surface datum, March 25, 1948; lowest measured, 250.40 ft below land-surface datum, May 24, 1977.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 12	214.20	MAR 30	202.49	JUL 12	207.67	SEP 21	204.46
WATER YEAR 1990		HIGHEST	202.49 MAR 30, 1990	LOWEST	214.20 DEC 12, 1989		



CASS COUNTY

411117095091902. Local number, 74-37-30 BBBB2.

LOCATION.--Lat 41°11'17", long 95°09'19", Hydrologic Unit 10240003, approximately 3 mi south of the Town of Griswold, and 1 mi west of Highway 48 on the Pottawattamie County-Cass County border. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--East Nishnabotna alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 70 ft, cased to 70 ft, slotted 69-70 ft, gravel packed.

METHOD.--Twice-a-month measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.

REMARKS.--Well SW-16B(L).

PERIOD OF RECORD.--July 1986 to current year.

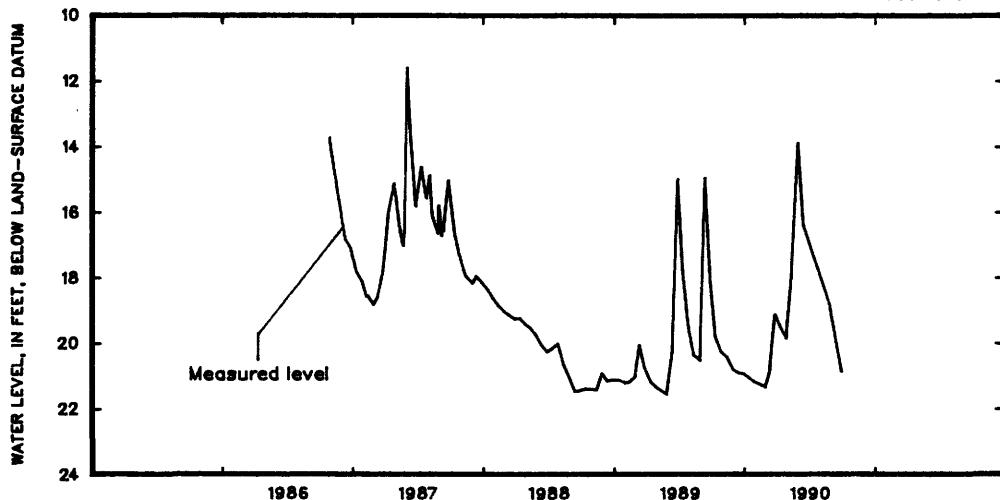
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.62 ft below land-surface datum, June 1, 1987; lowest measured, 21.59 ft below land-surface datum, May 25, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	19.87	DEC 27	20.96	MAR 11	20.83	MAY 28	13.90
25	20.30	JAN 10	21.08	25	19.14	JUN 13	16.46
NOV 10	20.46	25	21.20	APR 10	19.55	AUG 26	18.9
28	20.84	FEB 10	21.28	26	19.88	SEP 29	20.9
DEC 12	20.93	26	21.37	MAY 10	18.03		

WATER YEAR 1990 HIGHEST 13.90 MAY 28, 1990 LOWEST 21.37 FEB 26, 1990

411117095091902



411900094530101. Local number, 75-35-07 BBAB.

LOCATION.--Lat 41°19'00", long 94°55'30", Hydrologic Unit 10240003, approximately 3 mi north and 2.9 mi west of the Town of Cumberland, 2 mi south of County Road G-35 and 2.9 mi west of County Road N-28. Owner: Geological Survey Bureau/DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in., depth 218 ft, cased to 189 ft, slotted 189-209 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1295 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.35 ft above land-surface datum.

REMARKS.--SW-17 well.

PERIOD OF RECORD.--July 1986 to October 1987, February 1990 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 113.57 ft below land-surface datum, December 8, 1986; lowest measured, 125.75 ft below land-surface datum, March 14, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
FEB 21	119.77	APR 23	125.57	JUL 19	118.21	SEP 04	117.34
MAR 14	125.75	JUN 05	117.15				

WATER YEAR 1990 HIGHEST 119.77 JUN 05, 1990 LOWEST 125.75 MAR 14, 1990

CASS COUNTY

412832095033501. Local number, 77-37-13 BBBB.
LOCATION.--Lat 41°28'32", long 95°03'35", Hydrologic Unit 10240003, approximately 1 mi south of U.S. Interstate 80, and east of Highway 173. Approximately 2 mi north and 3 mi east of the Town of Marne. Owner: Geological Survey Bureau/DNR and U.S. Geological Survey.
AQUIFER.--Buried channel: in sand of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in., depth 201 ft, cased to 196 ft, slotted 196-201 ft. Open to Pennsylvanian limestone, 196-201'.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,298 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.
REMARKS.--SW-18 well.
PERIOD OF RECORD.--July 1986 to October 1987, February 1990 to present.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 115.90 ft below land-surface datum, December 8, 1986; lowest measured, 128.40 ft below land-surface datum, March 14, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

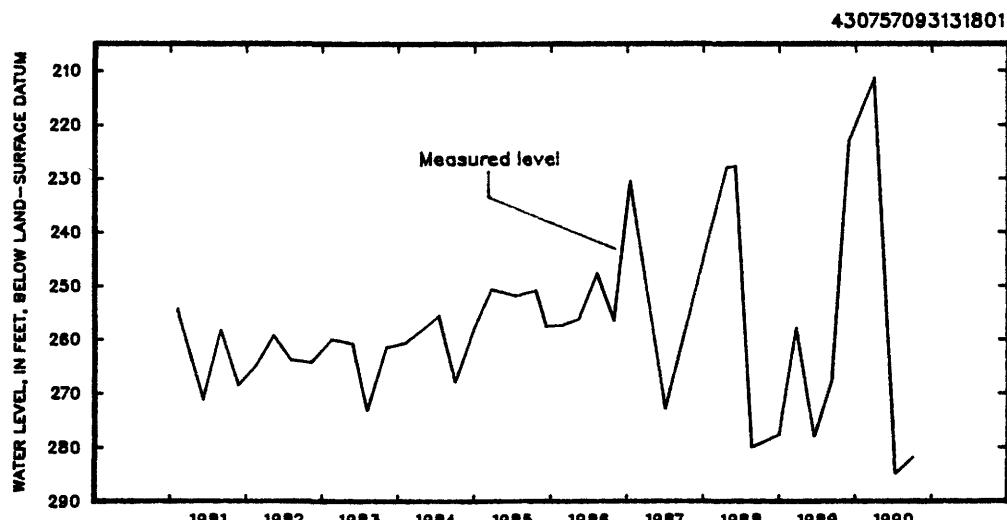
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 21 MAR 14	125.27 128.40	APR 23 JUN 06	125.05 123.59	JUL 19	125.05	SEP 04	122.21
WATER YEAR 1990		HIGHEST	122.21	SEP 04, 1990	LOWEST	128.40	MAR 14, 1990

CERRO GORDO COUNTY

430757093131801. Local number, 96-20-17 DAAD1.
LOCATION.--Lat 43°07'57", long 93°13'18", Hydrologic Unit 07080203, in southwest Mason City, 1 mi west of Highway 65 and south of the Iowa Terminal Railyard. Owner: AMPI Creamery (formerly State Brand Creameries).
AQUIFER.--Cambrian-Ordovician; in sandstone of Late Cambrian and sandy dolomite of Early Ordovician age.
WELL CHARACTERISTICS.--Unused drilled industrial artesian water well, diameter 10 in., depth 1,336 ft, cased from 0-1,080 ft, open hole from 1,080-1,336 ft.
METHOD.--Quarterly measurement with electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,162 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.30 ft above land-surface datum.
REMARKS.--State Brand Creameries Well #1. Records for 1968-1971 and 1973-1975 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--October 1968 to 1971, and March 1973 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 170.80 ft below land-surface datum, August 4, 1977; lowest measured, 298.80 ft below land-surface datum, October 22, 1968.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM. WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL		
NOV 27 MAR 26	222.95 211.54	JUL 05	284.22	JUL 09	285.06	SEP 26	282.01		
WATER LEVEL		HIGHEST	211.54	MAR 26	1990	LOWEST	285.06	JUL 09	1990



CERRO GORDO COUNTY

430806093164501. Local number, 96-21-13 BCCB1.

LOCATION.--Lat 43°08'06", long 93°16'45", Hydrologic Unit 07080203, south of the County Home, just north of Iowa Highway 106, east of the City of Clear Lake. Owner: Mason City and Clear Lake Railroad.

AQUIFER.--Devonian: in Cedar Valley limestone of Middle Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 198 ft. Casing information is not available.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,165 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of well curb, 1.30 ft above land-surface datum.

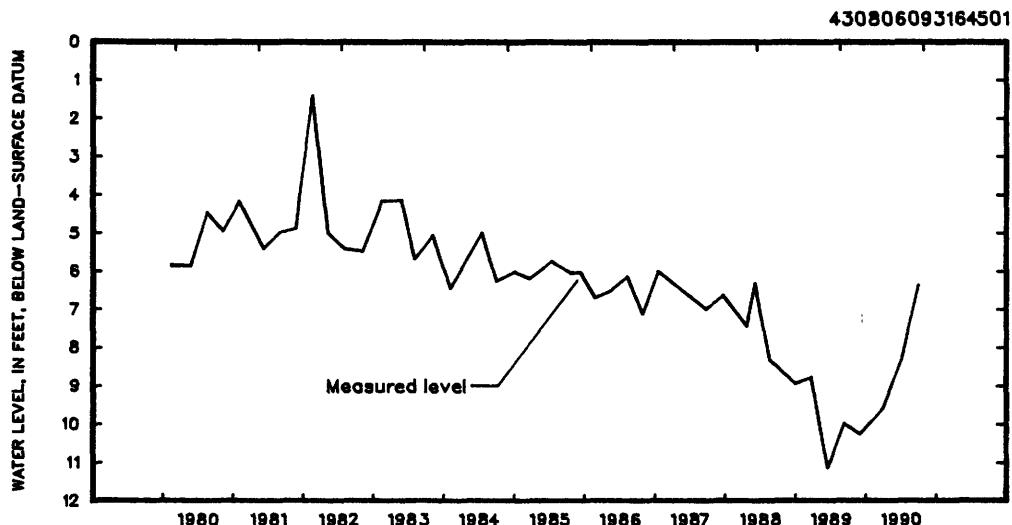
REMARKS.--None.

PERIOD OF RECORD.--November 1940 to August 1971, March 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.73 ft below land-surface datum, January 28, 1951; lowest measured, 17.26 ft below land-surface datum, November 18, 1955.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 27	10.30	MAR 26	9.60	JUL 05	8.25	SEP 26	6.39
WATER YEAR 1990	HIGHEST	6.39	SEP 26, 1990	LOWEST	10.30	NOV 27, 1989	



431123093124301. Local number, 97-20-28 CAAC1.

LOCATION.--Lat 43°11'23", long 93°12'43", Hydrologic Unit 07080203, north of Mason City at the southwest corner of the junction of Highway 65 and County Road D-20. Owner: American Crystal Sugar Corporation.

AQUIFER.--Cambrian-Ordovician and Devonian: in sandstone of Late Cambrian and Middle Ordovician age and limestone of Devonian age.

WELL CHARACTERISTICS.--Unused industrial drilled artesian waterwell, diameter 20 in., original depth 1,347 ft, back-filled to 1,257 ft in 1932, cased to 241 ft and 653-815 ft, open hole from 241-653 ft and 815-1,257 ft.

METHOD.--Quarterly measurement with electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,127 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.77 ft above land-surface datum.

REMARKS.--Records for 1937 to September 1988 are on file in the Iowa District Office.

PERIOD OF RECORD.--1937 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 148.00 ft below land-surface datum, August 29, 1944; lowest measured, 318.23 ft below land-surface datum, November 6, 1968.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

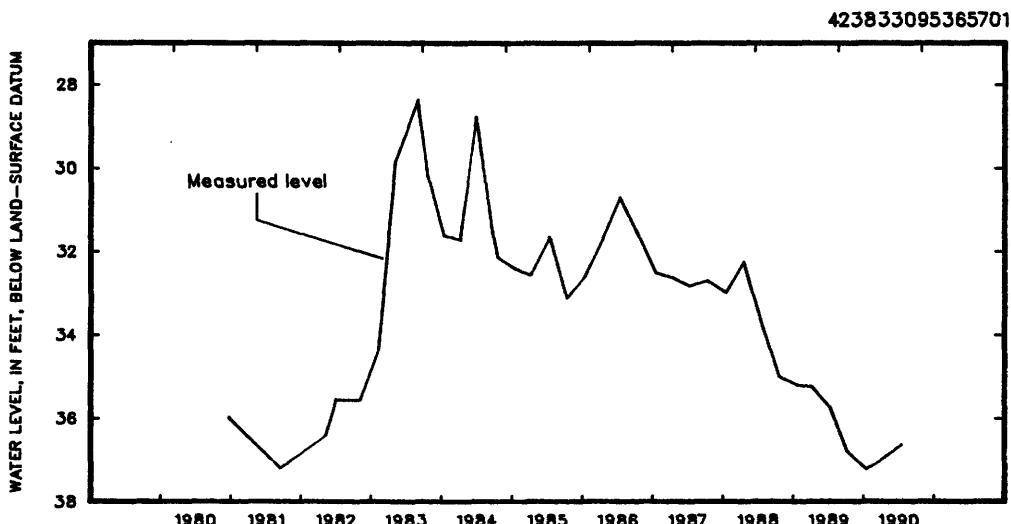
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 17	226.13	MAR 26	229.93	JUL 05	230.27	SEP 26	227.88
WATER YEAR 1990	HIGHEST	226.13	NOV 17, 1989	LOWEST	230.27	JUL 05, 1990	

CHEROKEE COUNTY

423833095365701. Local number, 90-40-06 BDCD1.
 LOCATION.--Lat 42°38'33", long 95°36'57", Hydrologic Unit 10230003, approximately 3.1 mi west of U.S. Highway 59 and 0.55 mi north of Iowa Highway 31 along the Illinois Central Railroad track. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Dakota; in sandstone of Cretaceous age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 1.25 in., depth 253 ft, cased to 252 ft, sandpoint 252-253 ft.
 METHOD.--Quarterly measurements with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,182 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.93 ft above land-surface datum.
 REMARKS.--Well D-6.
 PERIOD OF RECORD.--December 1978 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 28.38 ft below land-surface datum, August 27, 1983; lowest measured, 37.25 ft below land-surface datum, January 10, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	36.82	JAN 10	37.25	APR 11	36.97	JUL 12	36.64
WATER YEAR 1990	HIGHEST	36.64	JUL 12, 1990	LOWEST	37.25	JAN 10, 1990	



424348095231601. Local number, 91-39-01 ADAD1.
 LOCATION.--Lat 42°43'48", long 95°23'16", Hydrologic Unit 10230005, approximately 2 mi east and 0.5 mi north of the Town of Aurelia at the Larson Lake County Park. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Cambrian-Ordovician; in sandstone of Cambrian age and dolomite of Ordovician age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in. to 236 ft, 5 in. to 486 ft, 2 in. to 1,545 ft, depth 1,545 ft, cased to 1,126 ft, open hole 1,126 to 1,545 ft.
 METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.20 ft above land-surface datum.
 REMARKS.--Well D-28.
 PERIOD OF RECORD.--September 1979 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 189.65 ft below land-surface datum, December 19, 1984; lowest measured, 194.47 ft below land-surface datum, May 5, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	193.32	MAR 29	193.63	JUN 11	193.53	SEP 20	193.72
WATER YEAR 1990	HIGHEST	193.32	NOV 16, 1989	LOWEST	193.72	SEP 20, 1990	

CHEROKEE COUNTY

424348095231602. Local number, 91-39-01 ADAD2.
 LOCATION.--Lat $42^{\circ}43'48''$, long $95^{\circ}23'16''$, Hydrologic Unit 10230005, approximately 2 mi east and 0.5 mi north of the Town of Aurelia at the Larson Lake County Park. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 4 in., depth 340 ft, cased to 340 ft, perforated 235-240 ft.

METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.75 ft above land-surface datum.

REMARKS.--Well D-29.

PERIOD OF RECORD.--September 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 188.65 ft below land-surface datum, April 20, 1988; lowest measured, 194.15 ft below land-surface datum, August 24, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	190.05	MAR 29	190.53	JUN 11	190.51	SEP 20	190.64
		HIGHEST	190.05	NOV 16, 1989		LOWEST	190.64

WATER YEAR 1990

424132095480211. Local number, 91-42-16 DDD11.

LOCATION.--Lat $42^{\circ}41'32''$, long $95^{\circ}48'02''$, Hydrologic Unit 10230004, approximately 2 mi north of the Village of Fielding at the junction of County Roads L-35 and C-44. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 390 ft, cased to 390 ft, perforated 386-390 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,320 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.50 ft above land-surface datum.

REMARKS.--Well D-11.

PERIOD OF RECORD.--March 1980 to current year.

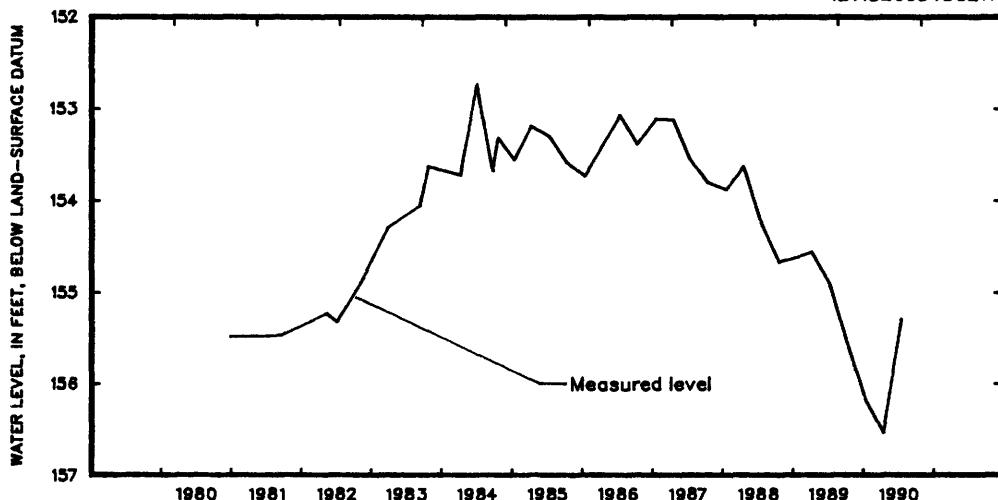
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 152.75 ft below land-surface datum, June 27, 1984; lowest measured, 156.55 ft below land-surface datum, April 11, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	155.57	JAN 10	156.20	APR 11	156.05	JUL 12	155.30
		HIGHEST	155.30	JUL 12, 1990		LOWEST	156.20

WATER YEAR 1990

424132095480211

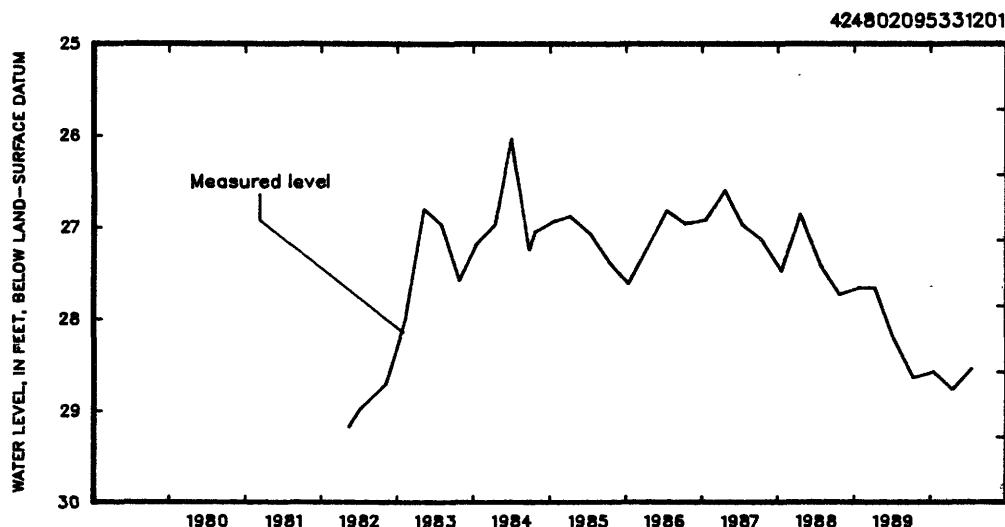


CHEROKEE COUNTY

424802095331201. Local number, 92-40-10 BDDD1.
 LOCATION.--Lat $42^{\circ}48'02''$, long $95^{\circ}33'12''$, Hydrologic Unit 10230003, west of U.S. Highway 59, approximately 2.5 mi north of the City of Cherokee. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Dakota: in sandstone of Cretaceous age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2.50 in., depth 300 ft, cased to 300 ft, perforated 114-118 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,210 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.30 ft above land-surface datum.
 REMARKS.--Well D-5.
 PERIOD OF RECORD.--April 1980 to October 1980, May 1982 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 28.05 ft below land-surface datum, June 27, 1984; lowest measured, 29.19 ft below land-surface datum, May 5, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	28.65	JAN 10	28.58	APR 11	28.78	JUL 12	28.54
		WATER YEAR 1990	HIGHEST	28.54	JUL 12, 1990	LOWEST	28.78 APR 11, 1990



424459095322411. Local number, 92-40-26 CCDD1.
 LOCATION.--Lat $42^{\circ}44'59''$, long $95^{\circ}32'24''$, Hydrologic Unit 10230003, in the City of Cherokee, to the north of County Road C-38 and east of Highway 59 near the old pumping station. Owner: City of Cherokee.
 AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian age and sandy dolomite of Early Ordovician age.
 WELL CHARACTERISTICS.--Unused drilled municipal artesian test water well, diameter 8 in., depth 1,055 ft, cased to 965 ft, open hole from 965-1055 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,180 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.53 ft above land-surface datum.
 REMARKS.--City of Cherokee Test #1.
 PERIOD OF RECORD.--November 1987 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 20.59 ft below land-surface datum, April 12, 1987; lowest measured, 27.21 ft below land-surface datum, July 12, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	25.69	JAN 10	23.95	APR 11	22.17	JUL 12	27.21
		WATER YEAR 1990	HIGHEST	22.17 APR 11, 1990	LOWEST	27.21 JUL 12, 1990	

CLAYTON COUNTY

424023091291201. Local number, 91-05-30 BBBB1.

LOCATION.--Lat $42^{\circ}40'23''$, long $91^{\circ}29'12''$, Hydrologic Unit 07060006, 5 mi northwest of the City of Edgewood, or 2 mi northwest of the junction of Iowa Highways 3 and 13, east of Strawberry Point. Owner: Harold Knight.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Dug unused water-table well, diameter 36 in., depth 36 ft. Casing information not available.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,233 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Hole in pump base at land-surface datum.

REMARKS.--None.

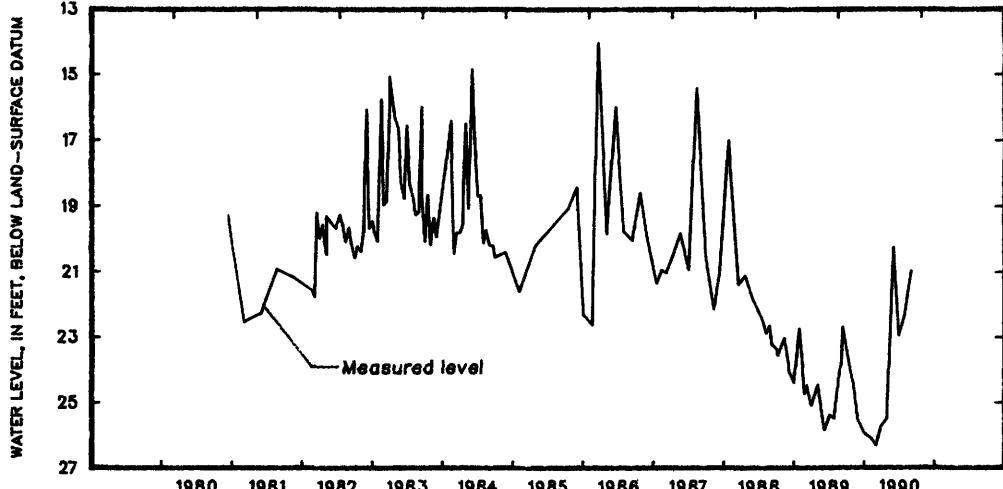
PERIOD OF RECORD.--June 1957 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 14.06 ft below land-surface datum, March 26, 1986; lowest measured, 30.68 ft below land-surface datum, January 12, 1959.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 19	23.90	JAN 05	25.97	APR 04	25.74	JUL 03	22.98
NOV 09	24.40	FEB 12	26.13	MAY 03	25.51	AUG 03	22.36
DEC 06	25.60	MAR 07	26.33	JUN 07	20.28	SEP 07	20.99
WATER YEAR 1990		HIGHEST 20.28 JUN 07, 1990				LOWEST 26.33 MAR 07, 1990	

424023091291201



424057091320001. Local number, 91-06-22 ACAC1.

LOCATION.--Lat $42^{\circ}40'57''$, long $91^{\circ}32'00''$, Hydrologic Unit 07060006, southeast corner of the junction of Iowa Highways 3 and 13, Strawberry Point. Owner: City of Strawberry Point.

AQUIFER.--Ordovician and Silurian: in dolomite of Late Ordovician and Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 16 in., depth 492 ft, cased to 161 ft with 16 in., 12 in. 130-161 ft; 10 in. liner 229-370 ft, open hole 161-229 ft and 370-492 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,219 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder platform, 2.10 ft above land-surface datum.

REMARKS.--City well No. 2. Recorder removed October 1987.

PERIOD OF RECORD.--March 1963 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 114.38 ft below land-surface datum, May 9, 1973; lowest recorded, 134.76 ft below land-surface datum, August 1, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 12	127.14	MAR 07	132.54	JUN 07	131.84	AUG 03	130.74
JAN 05	132.42	APR 04	131.23	JUL 03	129.72	SEP 07	127.04
FEB 12	131.98	MAY 03	134.09				
WATER YEAR 1990		HIGHEST 127.04 SEP 07, 1990				LOWEST 134.09 MAY 03, 1990	

GROUND-WATER LEVELS

CLAYTON COUNTY

430156091182901. Local number, 95-04-22 BCBD1.
 LOCATION.--Lat 43° 01' 56", long 91° 18' 29", Hydrologic Unit 07060001, approximately 2 mi north of the junction of U.S. Highway 18 and U.S. Highway 52-Iowa Highway 13, near Spook Cave. Owner: Gerald Mielke.

AQUIFER.--Cambrian-Ordovician: in St. Peter sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 49 ft. Casing information not available.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 940 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.00 ft above land-surface datum.

REMARKS.--None.

PERIOD OF RECORD.--October 1957 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.98 ft below land-surface datum, December 7, 1983; lowest measured, 27.88 ft below land-surface datum, March 4, 1968.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 07	23.98	APR 10	23.27	SEP 26	23.40
WATER YEAR 1990	HIGHEST	23.27	APR 10, 1990	LOWEST	23.98 DEC 07, 1989

425940091194701. Local number, 95-04-32 DDDD1.

LOCATION.--Lat 42° 59' 40", long 91° 19' 47", Hydrologic Unit 07060004, 1 mi west of the junction of U.S. Highway 52 and Iowa Highway 13, or northeast of the Town of Farmersburg. Owner: Milton and Willis Meier.

AQUIFER.--Cambrian-Ordovician: in St. Peter sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled stock artesian water well, diameter 6 in., depth 380 ft (reported). Casing information not available.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in pump base, 1.00 ft above land-surface datum.

REMARKS.--None.

PERIOD OF RECORD.--October 1957 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 74.08 ft below land-surface datum, July 10, 1984; lowest measured, 126.56 ft below land-surface datum, January 13, 1969.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 07	105.04	APR 10	108.09	JUL 12	109.88	SEP 26	110.82
WATER YEAR 1990	HIGHEST	105.04	DEC 07, 1989	LOWEST	110.82	SEP 26, 1990	

CRAWFORD COUNTY

415514095312001. Local number, 82-40-17 AABB1.

LOCATION.--Lat 41° 55' 14", long 95° 31' 20", Hydrologic Unit 10230007, approximately 1.5 mi west of the Town of Dow City on the south side of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 141 ft, cased to 141 ft, slotted from 123-141 ft, gravel-packed.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,150 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.

REMARKS.--Well WC-9.

PERIOD OF RECORD.--June 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 38.15 ft below land-surface datum, May 3, 1983; lowest measured, 43.86 ft below land-surface datum, June 11, 1981.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 08	42.42	FEB 02	42.1	APR 24	42.23	JUL 23	41.35
DEC 15	42.5	MAR 21	41.5	JUN 06	40.5	SEP 04	41.19

WATER YEAR 1990 HIGHEST 40.5 JUN 06, 1990 LOWEST 42.5 DEC 15, 1989

GROUND-WATER LEVELS

281

CRAWFORD COUNTY

415512095313801. Local number, 82-40-17 ABBC1.

LOCATION.--Lat 41°55'12", long 95°31'38", Hydrologic Unit 10230007, approximately 1.75 mi west of the Town of Dow City on County Road E-5L, north of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 46 ft, cased to 46 ft, slotted from 40-46 ft, gravel-packed.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,122 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.90 ft above land-surface datum.

REMARKS.--Well WC-188.

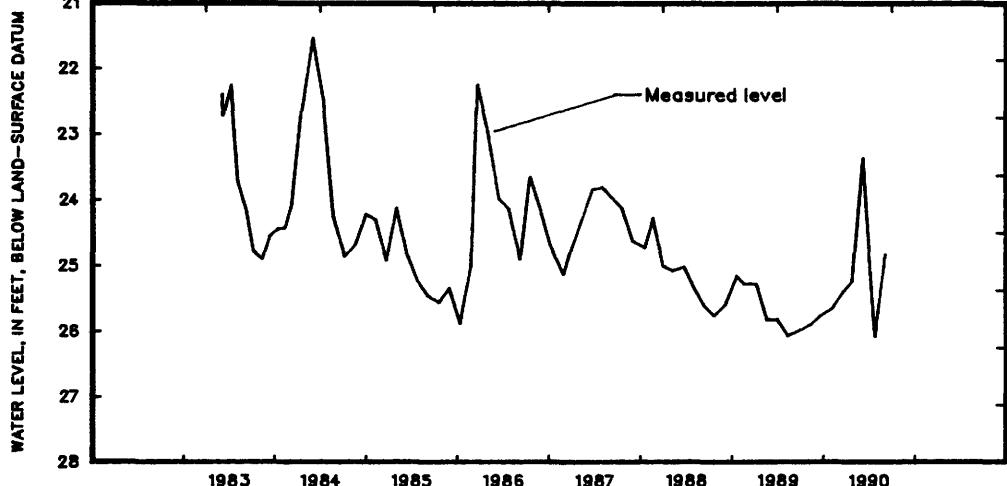
PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.55 ft below land-surface datum, May 30, 1984; lowest measured, 26.09 ft below land-surface datum, August 9, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
NOV 08	25.91	FEB 02	25.66	APR 24	25.25	JUL 23	26.1
DEC 15	25.78	MAR 21	25.4	JUN 06	23.38	SEP 04	24.84

WATER YEAR 1990 HIGHEST 23.38 JUN 06, 1990 LOWEST 26.1 JUL 23, 1990



420608095111701. Local number, 84-37-08 BCCB1.

LOCATION.--Lat 42°06'08", long 95°11'17", Hydrologic Unit 10230007, approximately 3 mi north of the Town of Vail on the east side of County Road E-25. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Fremont buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 541 ft, cased to 541 ft, slotted from 527-541 ft, gravel-packed. Open to Pennsylvanian limestone 539-541 ft.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,380 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.65 ft above land-surface datum.

REMARKS.--Well WC-226.

PERIOD OF RECORD.--July 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 208.35 ft below land-surface datum, July 17, 1988; lowest measured, 212.32 ft below land-surface datum, October 3, 1983.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
OCT 02	212.02	FEB 13	212.09	APR 17	211.95	JUL 10	211.69

WATER YEAR 1990 HIGHEST 211.69 JUL 10, 1990 LOWEST 212.09 FEB 13, 1990

CRAWFORD COUNTY

421106095125501. Local number, 85-38-12 DCBA1.

LOCATION.--Lat $42^{\circ}11'06''$, long $95^{\circ}12'55''$, Hydrologic Unit 10230007, approximately 5.5 mi east of the Town of Kiron on the south side of County Road E-16 near the Town of Boyer. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Fremont buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 341 ft, cased to 315 ft, slotted from 300-310 ft, gravel-packed open hole from 315-341 ft. Open to Pennsylvanian limestone and shale from 331-341 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,225 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.70 ft above land-surface datum.

REMARKS.--Well WC-14.

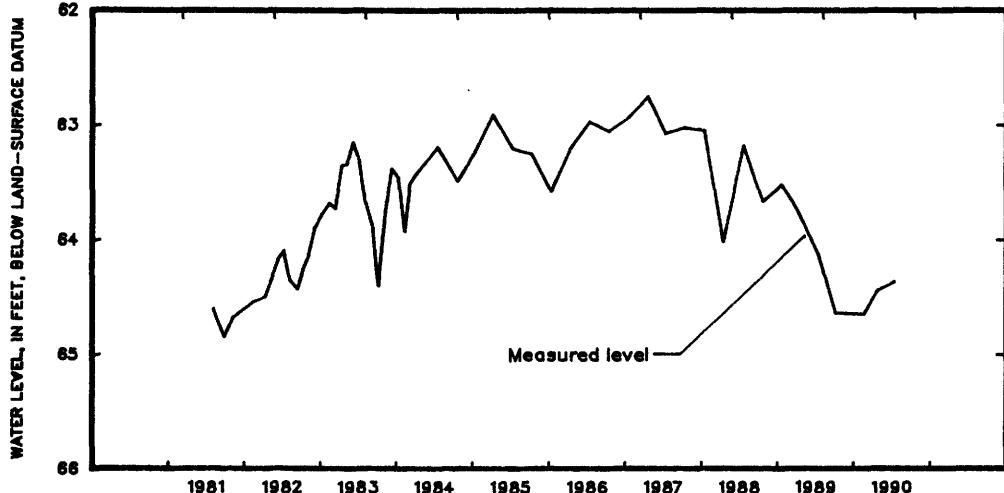
PERIOD OF RECORD.--July 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 62.76 ft below land-surface datum, April 16, 1987; lowest measured, 64.86 ft below land-surface datum, September 22, 1981.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	64.65	FEB 13	64.66	APR 17	64.45	JUL 10	64.37
WATER YEAR 1990	HIGHEST	64.37	JUL 10, 1990	LOWEST	64.66	FEB 13, 1990	

421106095125501



421031095225601. Local number, 85-39-16 ADDD1.

LOCATION.--Lat $42^{\circ}10'31''$, long $95^{\circ}22'56''$, Hydrologic Unit 10230007, approximately 2.5 mi east and 0.5 mi north of the Town of Schleswig on the west side of County Road M-27. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 351 ft, cased to 351 ft, slotted from 315-330 ft, gravel-packed. Open to Pennsylvanian rock from 344-351 ft.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.14 ft above land-surface datum.

REMARKS.--Well WC-7A.

PERIOD OF RECORD.--June 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 232.61 ft below land-surface datum, October 7, 1986; lowest measured, 238.35 ft below land-surface datum, June 10, 1981.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	237.09	FEB 13	235.88	APR 17	234.12	JUL 10	233.91
WATER YEAR 1990	HIGHEST	233.91	JUL 10, 1990	LOWEST	237.09	OCT 02, 1989	

CRAWFORD COUNTY

421031095225602. Local number, 85-39-16 ADDD2.

LOCATION.--Lat $42^{\circ}10'31''$, long $95^{\circ}22'56''$, Hydrologic Unit 10230007, approximately 2.5 mi east and 0.5 mi north of the Town of Schleswig on the west side of County Road M-27. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Mississippian: in limestone of Mississippian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 561 ft, cased to 561 ft, perforated 543-561 ft, gravel-packed.

METHOD.--Quarterly measurement with electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.14 ft above land-surface datum.

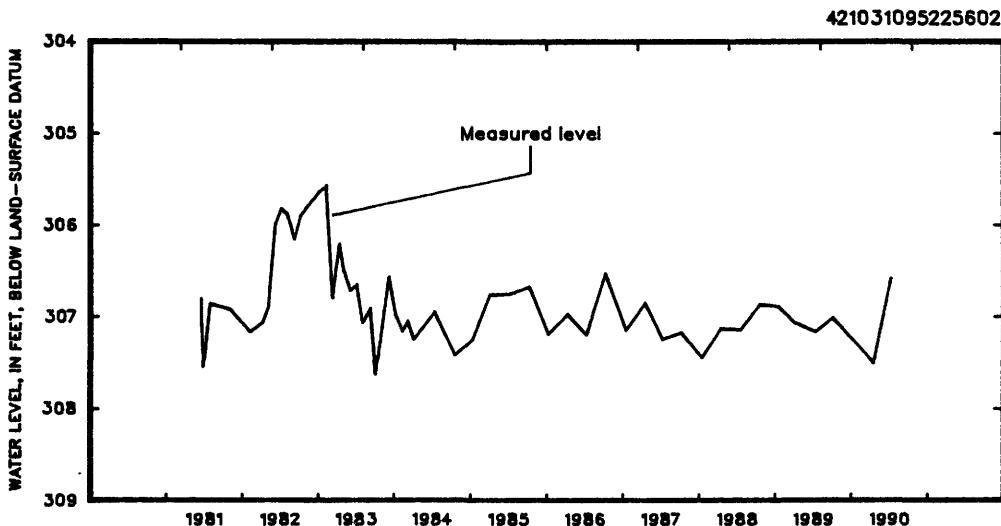
REMARKS.--Well WC-7B.

PERIOD OF RECORD.--June 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 305.58 ft below land-surface datum, February 8, 1983; lowest measured, 307.64 ft below land-surface datum, October 4, 1983.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	307.02	APR 17	307.52	JUL 10	306.59
WATER YEAR 1990	HIGHEST 306.59	JUL 10, 1990		LOWEST 307.52	APR 17, 1990



421005095342801. Local number, 85-41-13 CCCC1.

LOCATION.--Lat $42^{\circ}10'05''$, long $95^{\circ}34'28''$, Hydrologic Unit 10230001, approximately 7 mi west of the Town of Schleswig, northeast of the junction of County Roads L-51 and E-16. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota and glacial drift: in sandstone of Cretaceous age and sand and gravel of Pleistocene age. WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 361 ft, cased to 322 ft, slotted from 307-322 ft, gravel-packed. Open to Dakota Formation from 320-361 ft.

METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,375 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.49 ft above land-surface datum.

REMARKS.--Well WC-6.

PERIOD OF RECORD.--May 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 244.23 ft below land-surface datum, July 28, 1981; lowest measured, 249.05 ft below land-surface datum, February 4, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

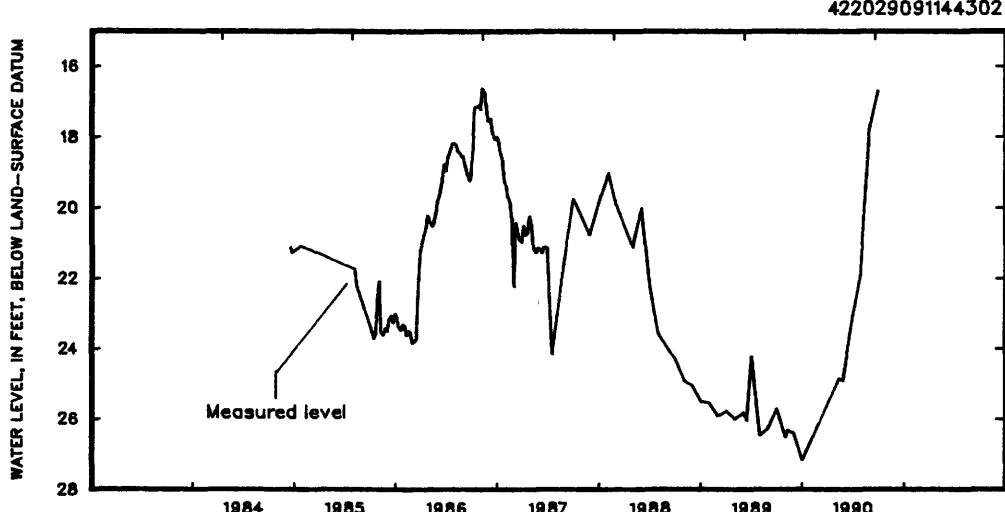
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	247.79	FEB 13	248.68	APR 17	247.55	JUL 10	247.48
WATER YEAR 1990	HIGHEST 247.48	JUL 10, 1990		LOWEST 248.68	FEB 13, 1990		

DELAWARE COUNTY

422029091144302. Local number, 87-03-18 CBCD2.
 LOCATION.--Lat $42^{\circ}20'37''$, long $91^{\circ}14'47''$, Hydrologic Unit 07060006, behind the municipal utilities building in downtown Hopkinton. Owner: Town of Hopkinton.
 AQUIFER.--Silurian: in dolomite of Silurian age.
 WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 86 ft. Casing information not available.
 METHOD.--Monthly measurement with chalked tape by observer.
 DATUM.--Elevation of land-surface datum is 863 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 2.46 ft above land-surface datum.
 REMARKS.--Hopkinton #1 well. Water levels affected by pumping of a nearby well.
 PERIOD OF RECORD.--December 1984 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 16.65 ft below land-surface datum, November 6, 1986; lowest measured, 27.19 ft below land-surface datum, December 30, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	26.54	DEC 30	27.19	JUN 29	23.10	AUG 27	17.84
NOV 07	26.34	MAY 09	24.88	JUL 27	21.91	SEP 28	16.71
30	26.44	25	24.94				
WATER YEAR 1990		HIGHEST	16.71	SEP 28, 1990		LOWEST	27.19 DEC 30, 1989



DES MOINES COUNTY

404844091142701. Local number, 69-03-06 AABA1.
 LOCATION.--Lat $40^{\circ}48'44''$, long $91^{\circ}14'27''$, Hydrologic Unit 07080104, at the Iowa Army Ammunition Plant, near the Town of Middleton. Owner: Iowa Ordnance Plant.
 AQUIFER.--Cambrian-Ordovician: in St. Peter sandstone of Middle Ordovician age.
 WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 16 in., depth 1,209 ft, cased to 855 ft, open hole 855-1,209 ft.
 METHOD.--Intermittent measurement with chalked tape by observer.
 DATUM.--Elevation of land-surface datum is 717 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of platform, 1.61 ft above land-surface datum.
 REMARKS.--Plant well No. 3.
 PERIOD OF RECORD.--March 1950 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 102.34 ft below land-surface datum, June 20, 1990; lowest measured, 201.75 ft below land-surface datum, Aug. 15, 1978.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 01	104.34	JAN 11	106.29	MAR 09	104.03	JUN 20	102.34
NOV 05	104.47	FEB 14	105.52	APR 06	103.91	JUL 06	103.09
WATER YEAR 1990		HIGHEST	102.34	JUN 20, 1990		LOWEST	106.29 JAN 11, 1990

DES MOINES COUNTY

404753091142501. Local number, 69-03-06 DDCD1.

LOCATION.--Lat $40^{\circ}47'53''$, long $91^{\circ}14'25''$, Hydrologic Unit 07080104, at the Iowa Army Ammunition Plant, near the Town of Middleton. Owner: Iowa Ordnance Plant.

AQUIFER.--Devonian and Mississippian: in Cedar Valley limestone of Devonian age and limestone of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 19 in., depth 675 ft, cased to 75 ft, open hole 75-675 ft.

METHOD.--Intermittent measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 699 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of platform, 1.91 ft above land-surface datum.

REMARKS.--Plant well No. 2.

PERIOD OF RECORD.--March 1950 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 74.46 ft below land-surface datum, April 18, 1975; lowest measured, 86.04 ft below land-surface datum, April 22, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 01	84.64	JAN 11	84.39	MAR 09	84.45	JUN 20	84.55
NOV 05	84.12	FEB 14	84.22	APR 06	84.49	JUL 06	84.74
WATER YEAR 1990	HIGHEST	84.12	NOV 05, 1989	LOWEST	84.74	JUL 06, 1990	

EMMET COUNTY

432927094345501. Local number, 100-32-11 DDDDD1.

LOCATION.--Lat $43^{\circ}29'27''$, long $94^{\circ}34'55''$, Hydrologic Unit 07100003, at Okamanpedan Lake Reserve State Park, north of the Town of Dolliver. Owner: State of Iowa.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled public-supply artesian water well, diameter 6 in., depth 277 ft. Casing information is not available.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,233 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in pump base, 0.61 ft above land-surface datum.

REMARKS.--None.

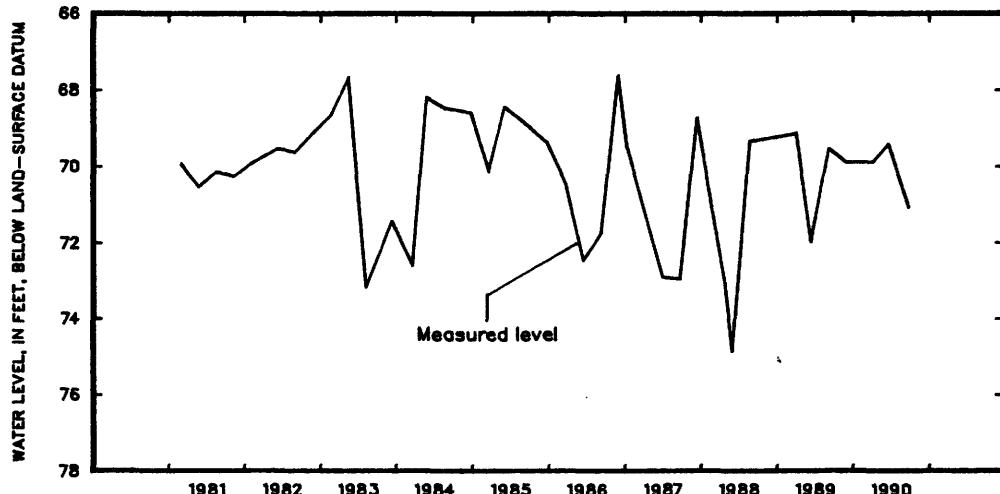
PERIOD OF RECORD.--November 1939 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 59.60 ft below land-surface datum, December 19, 1946; lowest measured, 77.86 ft below land-surface datum, August 7, 1979.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 21	69.95	MAR 28	69.95	JUN 12	69.46	SEP 19	71.14
WATER YEAR 1990	HIGHEST	69.46	JUN 12, 1990	LOWEST	71.14	SEP 19, 1990	

432927094345501



GROUND-WATER LEVELS

FRANKLIN COUNTY

423332093034302. Local number, 90-19-35 CDCC.

LOCATION.--Lat 42°33'32", long 90°19'35", Hydrologic Unit 07080205, 0.25 mi west of the intersection of U.S. Highway 20 and County Road S-56, on the north side of U.S. Highway 20 adjacent to the canning plant. Owner: City of Ackley.

AQUIFER.--Mississippian; in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 10 in., depth 175 ft, cased to 159 ft, perforated 99-159 ft, open hole 159-278 ft. Open to Devonian rock 124-175'.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,008 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.56 ft above land-surface datum.

REMARKS.--Ackley No. 1 well, formerly Marshall Canning Co. No. 2.

PERIOD OF RECORD.--September 1988 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 30.04 ft below land-surface datum, September 8, 1988; lowest measured, 34.05 ft below land-surface datum, November 21, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1987 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP 08, 1988	30.04	NOV 21, 1989	34.05	JUL 11, 1990	31.18	SEP 28, 1990	31.37
JAN 13, 1989	31.53						
		WATER YEAR 1990	HIGHEST	31.18	JUL 11, 1990	LOWEST	34.05 NOV 21, 1989

GREENE COUNTY

415449094161501. Local number, 82-29-18 CAAA1.

LOCATION.--Lat 41°54'49", long 94°16'15", Hydrologic Unit 07100006, approximately 0.5 mi south and 4 mi east of the Village of Cooper and just south of County Road E-57. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Pennsylvanian; in sandstone of Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 101 ft, cased to 100 ft, perforated 89-100 ft, gravel-packed; open hole 100-101 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 960 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

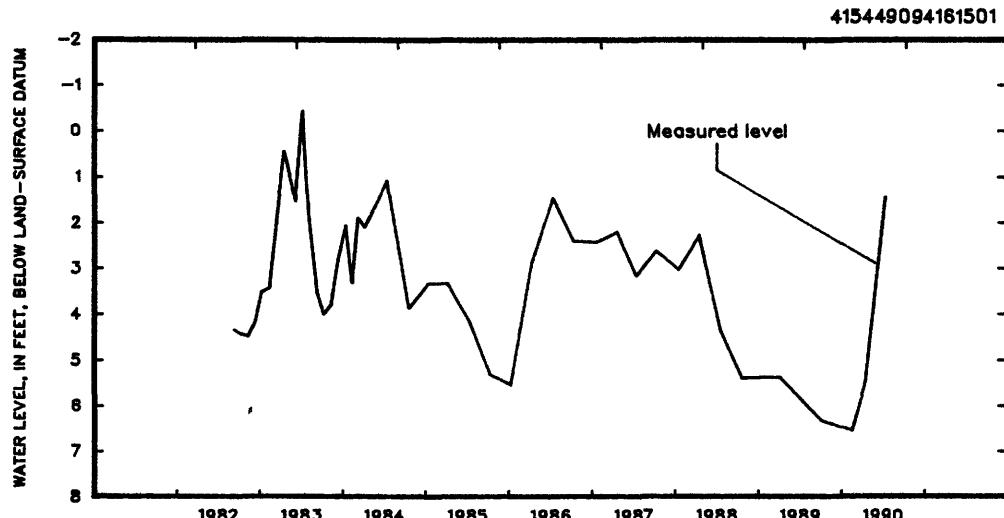
REMARKS.--Well W-116.

PERIOD OF RECORD.--September 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.41 ft above land-surface datum, July 12, 1989; lowest measured, 6.57 ft below land-surface datum, February 13, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	6.36	FEB 13	6.57	APR 16	5.44	JUL 10	1.45
		WATER YEAR 1990	HIGHEST	1.45	JUL 10, 1990	LOWEST	6.57 FEB 13, 1990



GREENE COUNTY

415448094163401. Local number, 82-29-18 CBAA1.
 LOCATION.--Lat $41^{\circ}54'48''$, long $94^{\circ}16'34''$, Hydrologic Unit 07100006, approximately 3.75 west and 1.5 mi south of the Town of Rippey, south of County Road E-57 on the west edge of the North Raccoon River.
 Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--North Raccoon alluvial: in sand and gravel of Holocene age.
 WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 34 ft, cased to 30 ft, slotted from 20-30 ft, gravel-packed. Open hole from 30-34 ft into glacial till.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 965 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.45 ft above land-surface datum.

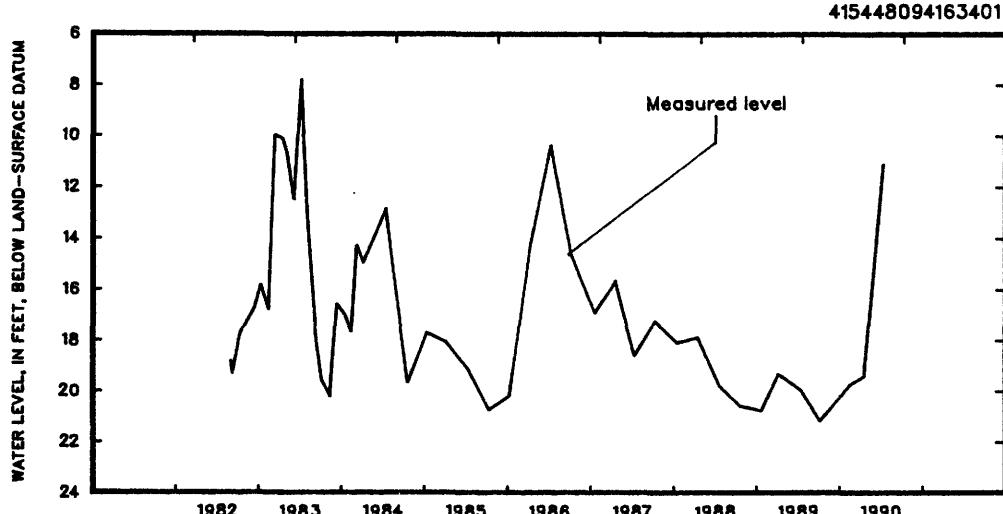
REMARKS.--Well WC-115.

PERIOD OF RECORD.--August 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.84 ft below land-surface datum, July 5, 1983; lowest measured, 21.21 ft below land-surface datum, October 2, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	21.21	FEB 13	19.76	APR 16	19.43	JUL 10	11.12
WATER YEAR 1990	HIGHEST	11.12	JUL 10, 1990	LOWEST	21.21	OCT 02, 1989	



415449094155601. Local number, 82-29-18 DBAA.

LOCATION.--Lat $41^{\circ}54'49''$, long $94^{\circ}15'56''$, Hydrologic Unit 07100006, approximately 3.25 mi west and 1.5 mi south of the Town of Rippey, south of County Road E-57. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 90 ft, cased to 75 ft, slotted 65-75 ft, gravel-packed; open hole from 75-90 ft. Pleistocene glacial till open from 75-86 ft, and Pennsylvanian shale and siltstone open from 86-90 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,005 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.85 ft above land-surface datum.

REMARKS.--Well WC-117.

PERIOD OF RECORD.--August 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 32.64 ft below land-surface datum, July 5, 1983; lowest measured, 40.13 ft below land-surface datum, February 13, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	39.83	FEB 13	40.13	APR 16	38.84	JUL 10	35.13
WATER YEAR 1990	HIGHEST	35.13	JUL 10, 1990	LOWEST	40.13	FEB 13, 1990	

GREENE COUNTY

415449094173201. Local number, 82-30-13 CABA1.

LOCATION.--Lat $41^{\circ}54'49''$, long $94^{\circ}17'32''$, Hydrologic Unit 07100006, approximately 0.5 mi south and 3 mi east of the Village of Cooper and just south of County Road E-57. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Pennsylvanian: in sandstone of Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 230 ft, cased to 230 ft, perforated 209-230 ft, gravel-packed. Original depth 245 ft, casing plugged at 230 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,035 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.45 ft above land-surface datum.

REMARKS.--Well WC-118.

PERIOD OF RECORD.--September 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 66.79 ft below land-surface datum, July 5, 1983; lowest measured, 73.67 ft below land-surface datum, February 13, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	73.53	FEB 13	73.67	APR 16	73.53	JUL 10	69.32
WATER YEAR 1990	HIGHEST	69.32	JUL 10, 1990	LOWEST	73.67	FEB 13, 1990	

415608094260701. Local number, 82-31-10 AAAA1.

LOCATION.--Lat $41^{\circ}56'08''$, long $94^{\circ}26'07''$, Hydrologic Unit 07100006, approximately 7 mi south and 3.5 mi west of the City of Jefferson, 1.0 mi east of the junction of County Roads E-57 and P-14 on the south side of County Road E-57. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 125 ft, cased to 125 ft, slotted 111-120, gravel-packed. Open to Pennsylvanian shale and coal 121-125 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,108 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

REMARKS.--Well WC-235.

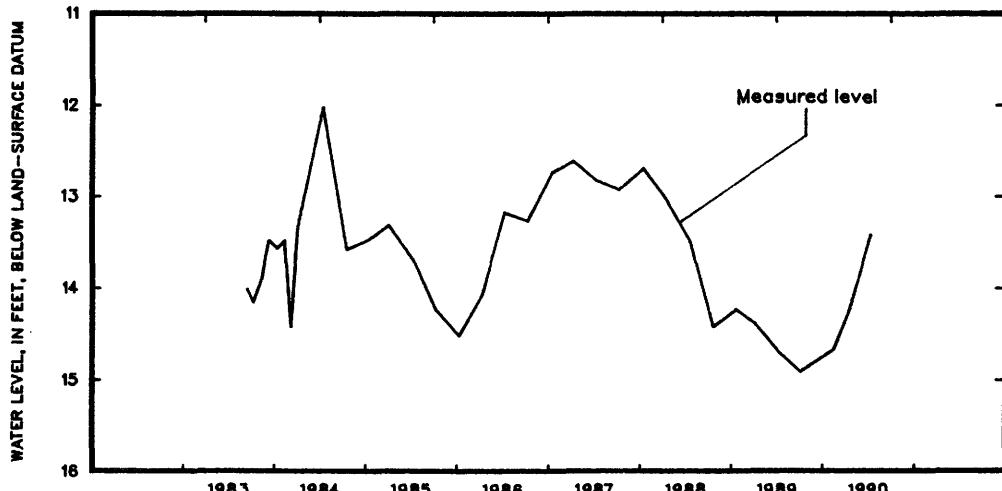
PERIOD OF RECORD.--September 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.03 ft below land-surface datum, July 12, 1984; lowest measured, 14.92 ft below land-surface datum, October 2, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	14.92	FEB 13	14.67	APR 16	14.24	JUL 10	13.42
WATER YEAR 1990	HIGHEST	13.42	JUL 10, 1990	LOWEST	14.92	OCT 02, 1989	

415608094260701



GREENE COUNTY

420149094344701. Local number, 83-32-04 ACC1.

LOCATION.--Lat 42°01'49", long 94°34'47", Hydrologic Unit 07100006, 1.5 mi west of the Town of Scranton south of U.S. Highway 30, adjacent to the Scranton Cemetery. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 240 ft, cased to 240 ft, slotted 220-240 ft, gravel-packed. Open to Pennsylvanian shale 234-240 ft.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,202 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.

REMARKS.--Well WC-228.

PERIOD OF RECORD.--July 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 152.77 ft below land-surface datum, October 4, 1983; lowest measured, 153.93 ft below land-surface datum, July 29, 1983.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	153.42	FEB 13	153.21	APR 16	153.29	JUL 10	153.38
WATER YEAR 1990	HIGHEST	153.21	FEB 13, 1990	LOWEST	153.42	OCT 02, 1989	

420116094363001. Local number, 83-32-08 BBBC1.

LOCATION.--Lat 42°01'16", long 94°36'30", Hydrologic Unit 07100006, approximately 3 mi west of the Town of Scranton, south of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Hardin Creek buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 181 ft, cased to 181 ft, slotted 161-171 ft, gravel-packed. Open to Pennsylvanian shale and siltstone, 171-181 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,135 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.

REMARKS.--Well WC-229.

PERIOD OF RECORD.--September 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 39.64 ft below land-surface datum, July 12, 1984; lowest measured, 51.03 ft below land-surface datum, July 8, 1985.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	43.92	FEB 13	43.39	APR 16	42.22	JUL 10	41.46
WATER YEAR 1990	HIGHEST	41.46	JUL 10, 1990	LOWEST	43.92	OCT 02, 1989	

420507094141901. Local number, 84-29-16 CBAB1.

LOCATION.--Lat 42°05'07", long 94°14'19", Hydrologic Unit 07100006, approximately 1.5 mi south of the Town of Dana, east of Iowa Highway 144 near the Chicago and Northwestern Railroad. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Beaver buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 181 ft, cased to 181 ft, slotted 161-176 ft, gravel-packed. Open to Pennsylvanian shale 177-181 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,075 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.80 ft above land-surface datum.

REMARKS.--Well WC-233.

PERIOD OF RECORD.--August 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 38.63 ft below land-surface datum, April 2, 1985; lowest measured, 42.81 ft below land-surface datum, July 12, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	43.28	FEB 13	41.77	APR 16	41.34	JUL 10	41.89
WATER YEAR 1990	HIGHEST	41.34	APR 16, 1990	LOWEST	43.28	OCT 02, 1989	

GREENE COUNTY

420603094355101. Local number, 84-32-08 ACDB1.

LOCATION.--Lat $42^{\circ}06'03''$, long $94^{\circ}35'51''$, Hydrologic Unit 07100006, approximately 3.5 mi north and 1.5 mi east of the Town of Ralston near the Raccoon River Bible Camp. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Pennsylvanian and Dakota: in sandstone of Pennsylvanian and Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in., depth 141 ft, cased to 129 ft, slotted 119-129 ft, gravel-packed. Open to Pennsylvanian sandstones from 129-141 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,070 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.55 ft above land-surface datum.

REMARKS.--Well WC-124.

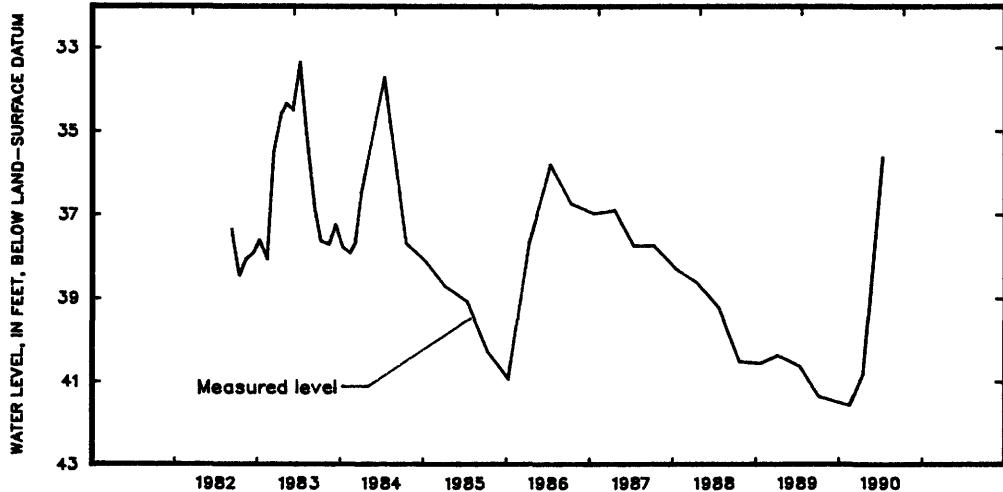
PERIOD OF RECORD.--September 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 33.36 ft below land-surface datum, July 5, 1983; lowest measured, 41.60 ft below land-surface datum, February 13, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	41.38	FEB 13	41.60	APR 16	40.81	JUL 10	35.63
WATER YEAR 1990	HIGHEST	35.63	JUL 10, 1990	LOWEST	41.60	FEB 13, 1990	

420603094355101



420723094143201. Local number, 85-29-32 DDDD1.

LOCATION.--Lat $42^{\circ}07'23''$, long $94^{\circ}14'32''$, Hydrologic Unit 07100006, 1 mi north of the Town of Dana on the west side of Iowa Highway 144. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Beaver buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 171 ft, cased to 171 ft, slotted 153-168 ft, gravel-packed. Open to Pennsylvanian shale and sandy limestone from 165-171 ft.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,091 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.

REMARKS.--Well WC-232.

PERIOD OF RECORD.--August 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 38.70 ft below land-surface datum, April 2, 1985; lowest measured, 41.78 ft below land-surface datum, October 2, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	41.78	FEB 13	41.40	APR 16	41.06	JUL 10	40.95
WATER YEAR 1990	HIGHEST	40.95	JUL 10, 1990	LOWEST	41.78	OCT 02, 1989	

GRUNDY COUNTY

422605092560001. Local number, 88-18-15 DBBB1.

LOCATION.--Lat $42^{\circ}26'05''$, long $92^{\circ}56'00''$, Hydrologic Unit 07080205, west of the corner of Monroe and 4t Streets and west of the high school, Wellsburg. Owner: City of Wellsburg.

AQUIFER.--Devonian: in limestone and dolomite of Late Devonian age.

WELL CHARACTERISTICS.--Drilled public-emergency-supply artesian water well, diameter 12 in., depth 280 ft, cased to 128 ft, open hole 128-280 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,060 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Edge of vent pipe, 1.25 ft above land-surface datum.

REMARKS.--None.

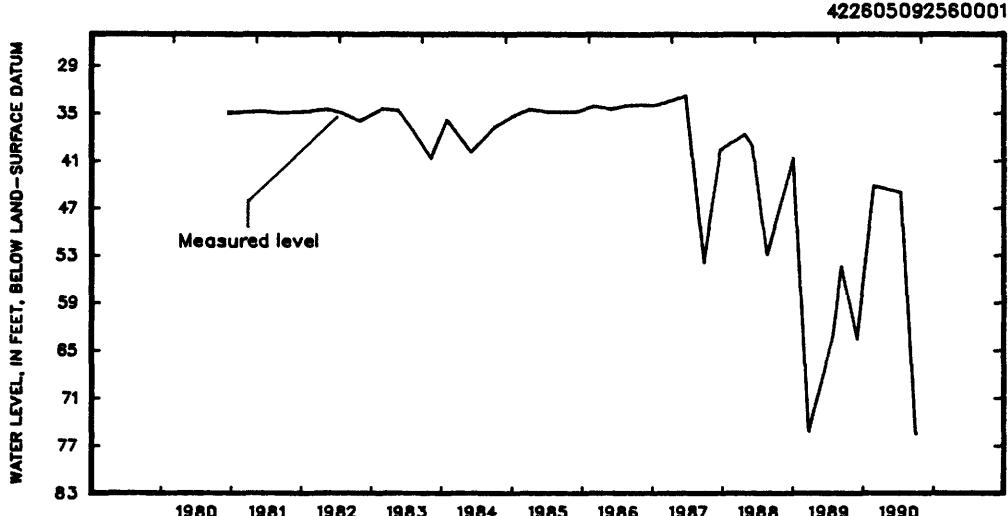
PERIOD OF RECORD.--September 1960 to August 1971, May 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 32.78 ft below land-surface datum, June 18, 1987; lowest measured, 96.81 ft below land-surface datum, September 27, 1960.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 28	63.65	FEB 22	44.20	JUL 11	45.13	SEP 28	75.65
WATER YEAR 1990	HIGHEST	44.20	FEB 22, 1990	LOWEST	75.65	SEP 28, 1990	

p Well recently pumped.



GUTHRIE COUNTY

413223094150801. Local number, 78-30-24 CAAB1

LOCATION.--Lat $41^{\circ}32'23''$, long $94^{\circ}15'08''$, Hydrologic Unit 07100007, approximately 0.5 mi west and 1.5 north of the Town of Dexter. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drill observation artesian water well, diameter 2 in., depth 72 ft, cased to 72 ft, slotted 60-68 ft, gravel-packed. Open to Pennsylvanian shale 65-72 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,020 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.

REMARKS.--Well WC-238.

PERIOD OF RECORD.--August 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 41.90 ft below land-surface datum, October 6, 1987; lowest measured, 48.82 ft below land-surface datum, April 10, 1986.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	41.98	FEB 14	42.99	APR 16	42.24	JUL 12	42.06
WATER YEAR 1990	HIGHEST	41.98	OCT 03, 1989	LOWEST	42.99	FEB 14, 1990	

GROUND-WATER LEVELS

GUTHRIE COUNTY

413248094314301. Local number, 78-32-21 AAAA1.

LOCATION.--Lat $41^{\circ}32'48''$, long $94^{\circ}31'43''$, Hydrologic Unit 07100008, approximately 2.25 mi north of the Town of Casey. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 161 ft, cased to 135 ft, slotted 125-135 ft, gravel-packed. Open to Pennsylvanian shale 158-161 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,250 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.90 ft above land-surface datum.

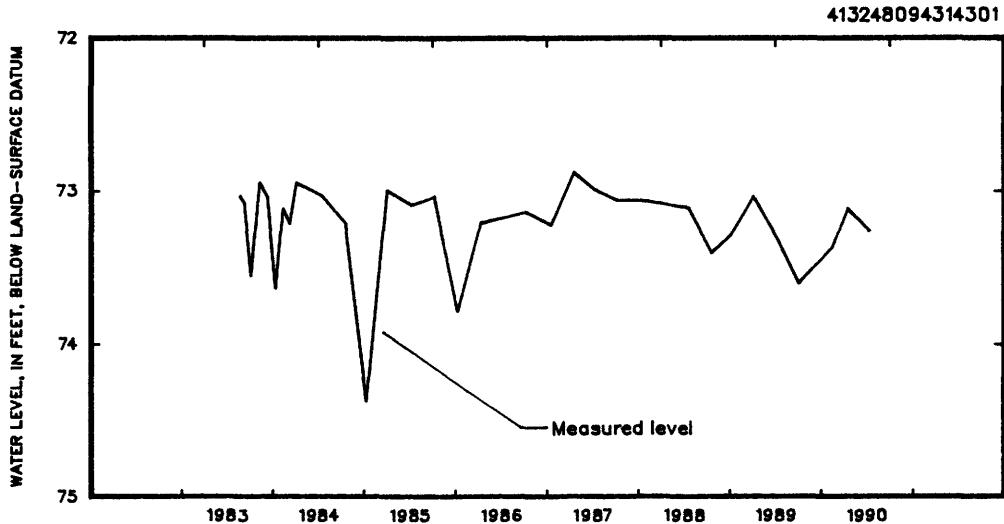
REMARKS.--Well WC-239.

PERIOD OF RECORD.--August 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 70.50 ft below land-surface datum, January 12, 1988; lowest measured, 74.38 ft below land-surface datum, January 9, 1985.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	73.61	FEB 14	73.37	APR 16	73.12	JUL 12	73.27
WATER YEAR 1990	HIGHEST	73.12	APR 16, 1990	LOWEST	73.61	OCT 03, 1989	



413837094194601. Local number, 79-30-22 BAAC1.

LOCATION.--Lat $41^{\circ}38'37''$, long $94^{\circ}19'46''$, Hydrologic Unit 07100007, approximately 2.5 mi west of the Town of Linden on the west side of County Road F-51. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 152 ft, cased to 150 ft, slotted 140-150 ft, gravel-packed. Open to Pennsylvanian shale 149-152 ft.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,140 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.85 ft above land-surface datum.

REMARKS.--Well WC-109.

PERIOD OF RECORD.--August 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 135.85 ft below land-surface datum, January 15, 1987; lowest measured, 140.75 ft below land-surface datum, August 18, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	140.44	FEB 14	140.42	APR 16	139.96	JUL 12	140.88
WATER YEAR 1990	HIGHEST	139.96	APR 16, 1990	LOWEST	140.88	JUL 12, 1990	

GUTHRIE COUNTY

414110094260501. Local number, 79-31-23 BBBB1.

LOCATION.--Lat 41°41'10", long 94°26'05", Hydrologic Unit 07100007, approximately 1 mi north of the Town of Monteith on the east side of County Road P-20. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--South Raccoon alluvial; in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 30 ft, cased to 27 ft, slotted 21-27 ft, gravel-packed. Open to Pennsylvanian shale 27-30 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,037 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.50 ft above land-surface datum.

REMARKS.--Well WC-85.

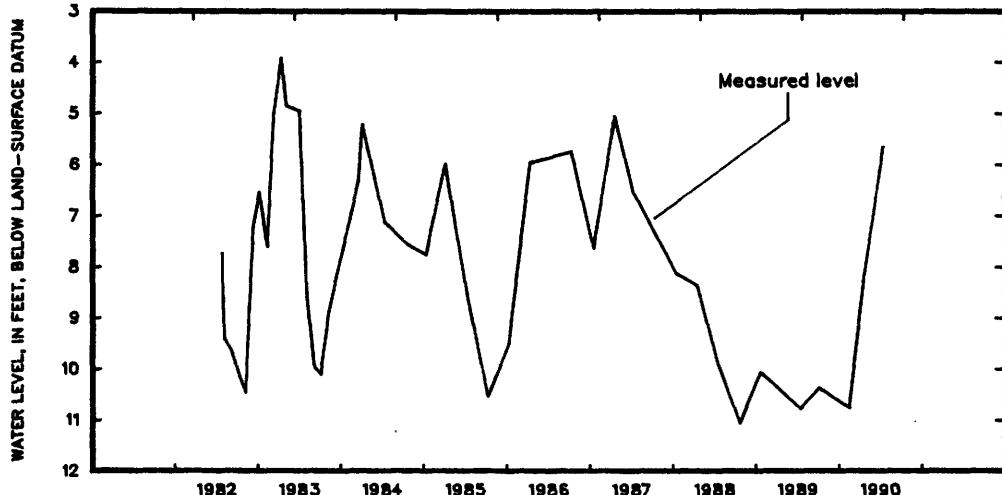
PERIOD OF RECORD.--July 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.93 ft below land-surface datum, April 11, 1983; lowest measured, 11.07 ft below land-surface datum, October 19, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	10.37	FEB 14	10.78	APR 16	8.33	JUL 12	5.66
WATER YEAR 1990	HIGHEST		5.66	JUL 12, 1990	LOWEST	10.78	FEB 14, 1990

414110094260501



414514094381601. Local number, 80-33-12 ACCC1.

LOCATION.--Lat 41°45'14", long 94°38'16", Hydrologic Unit 07100007, approximately 6.5 mi west and 4.5 mi north of the Town of Guthrie Center on County Road N-56. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota; in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 81 ft, cased to 81 ft, slotted 60-66 ft, gravel-packed.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,170 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.

REMARKS.--Well WC-90.

PERIOD OF RECORD.--July 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.42 ft below land-surface datum, May 4, 1983; lowest measured, 12.75 ft below land-surface datum, October 19, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	11.77	FEB 14	11.82	APR 16	11.69	JUL 12	9.56
WATER YEAR 1990	HIGHEST		9.56	JUL 12, 1990	LOWEST	11.82	FEB 14, 1990

GUTHRIE COUNTY

414821094271301. Local number, 81-31-22 CCCC1.
 LOCATION.--Lat 41° 48' 21", long 94° 27' 13", Hydrologic Unit 07100007, approximately 2.5 mi south and 1 mi west of the Town of Bagley, north of Spring Brook State Park. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Dakota: in sandstone of Cretaceous age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 153 ft, cased to 153 ft, slotted 143-153 ft, gravel-packed. Open to Pennsylvanian shale 149-153 ft.
 METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,190 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.
 REMARKS.--Well WC-105.
 PERIOD OF RECORD.--August 1982 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 60.52 ft below land-surface datum, October 6, 1987, and April 13, 1988; lowest measured, 69.88 ft below land-surface datum, December 9, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	64.77	FEB 14	65.33	APR 16	65.16
WATER YEAR 1990	HIGHEST	64.77	OCT 03, 1989	LOWEST	65.33 FEB 14, 1990

414652094293301. Local number, 81-31-32 CBCC1.
 LOCATION.--Lat 41° 46' 52", long 94° 29' 33", Hydrologic Unit 07100007, approximately 1 mi west of Spring-brook State Park at the junction of Iowa Highways 25 and 384. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Middle Raccoon alluvial: in sand and gravel of Holocene age.
 WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 52 ft, cased to 51 ft, slotted 40-51 ft, gravel-packed, open hole 51-52 ft. Open to Pennsylvanian shale, 49-52 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.03 ft above land-surface datum.
 REMARKS.--Well WC-106.
 PERIOD OF RECORD.--August 1982 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 30.33 ft below land-surface datum, July 1, 1983; lowest measured, 35.92 ft below land-surface datum, October 6, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	35.02	FEB 14	35.36	APR 16	34.50	JUL 12	31.53
WATER YEAR 1990	HIGHEST	31.53	JUL 12, 1990	LOWEST	35.36	FEB 14, 1990	

414728094385301. Local number, 81-33-26 DDDD1.
 LOCATION.--Lat 41° 47' 28", long 94° 38' 53", Hydrologic Unit 07100007, approximately 5 mi south and 1.25 mi east of the Town of Coon Rapids on the north side of County Road F-24. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Dakota: in sandstone of Cretaceous age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 80 ft, cased to 75 ft, slotted 60-65 ft, gravel-packed, open hole 75-80 ft. Open to Pennsylvanian shale 67-80 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,205 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.
 REMARKS.--Well WC-93.
 PERIOD OF RECORD.--July 1982 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 38.52 ft below land-surface datum, June 7, 1983; lowest measured, 40.98 ft below land-surface datum, January 3, 1983.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	40.68	FEB 14	40.70	APR 16	39.74	JUL 12	40.42
WATER YEAR 1990	HIGHEST	39.74	APR 16, 1990	LOWEST	40.70	FEB 14, 1990	

GUTHRIE COUNTY

414728094392401. Local number, 81-33-35 ABBC1.

LOCATION.--Lat 41°47'28", long 94°39'24", Hydrologic Unit 07100007, approximately 5 mi south and 1 mi east of the Town of Coon Rapids, on the south side of County Road F-24. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--South Raccoon alluvial; in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 41 ft, cased to 35 ft, slotted 26-35 ft gravel-packed, open hole 35-41 ft. Open to Early Cretaceous sandstone and shale 38-41 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,150 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.80 ft above land-surface datum.

REMARKS.--Well WC-94.

PERIOD OF RECORD.--July 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.80 ft below land-surface datum, July 1, 1983; lowest measured, 16.94 ft below land-surface datum, February 14, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	16.56	FEB 14	16.94	APR 16	16.33	JUL 12	14.99
WATER YEAR 1990	HIGHEST	14.99	JUL 12, 1990	LOWEST	16.94	FEB 14, 1990	

HARDIN COUNTY

423310093032802. Local number, 89-19-02 BDAC.

LOCATION.--Lat 42°33'10", long 93°03'28", Hydrologic Unit 07080205, 0.35 south and 0.10 mi west of the intersection of U.S. Highway 20 and County Road S-56. Well is in a shed at the west end of 2nd Avenue adjacent to railroad tracks. Owner: City of Ackley.

AQUIFER.--Mississippian; in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 10 in., depth 134 ft, cased to 68 ft, perforated 57-60 ft, open hole 68-134 ft. Open to Devonian rock 131-134 ft.

INSTRUMENTATION.--Analog digital recorder.

DATUM.--Elevation of land-surface datum is 1,085 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder base, 0.8 ft above land-surface datum.

REMARKS.--Ackley No. 5 well.

PERIOD OF RECORD.--September 1988 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 19.06 ft below land-surface datum, August 3, 1990; lowest measured, 24.15 ft below land-surface datum, February 25, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1988 TO SEPTEMBER 1990
NOON VALUES

WATER YEAR 1989

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	-----	-----	-----	-----	21.21	21.51	21.11	20.21	21.08	22.16	23.11	23.82
10	-----	-----	-----	-----	21.13	21.30	20.30	20.31	21.41	22.35	23.33	23.74
15	-----	-----	-----	21.23	21.40	21.10	21.06	20.22	21.55	22.63	23.42	23.65
20	-----	-----	-----	21.34	21.09	21.09	21.08	20.40	21.69	22.62	23.41	23.74
25	-----	-----	-----	21.15	21.10	21.04	20.93	20.33	21.81	22.83	23.71	23.71
EOM	-----	-----	-----	20.50	21.28	21.01	20.68	20.67	22.02	22.87	23.65	23.79

WATER YEAR 1990

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	23.51	23.68	23.37	23.67	23.56	23.85	21.86	21.34	20.37	20.11	19.27	19.36
10	23.68	23.38	23.64	23.50	23.65	23.07	21.87	21.25	20.65	20.27	19.25	19.59
15	23.64	-----	23.76	23.58	23.74	22.31	21.73	20.97	20.65	19.85	19.32	19.93
20	23.74	-----	23.80	23.32	23.90	22.12	21.70	20.82	20.08	20.01	19.52	19.74
25	23.65	23.52	23.43	23.47	24.11	22.00	21.77	20.56	19.86	19.84	19.25	19.96
EOM	23.40	23.75	23.56	23.56	23.99	21.66	21.62	20.49	19.95	19.22	19.40	-----

HARRISON COUNTY

413024095353901. Local number, 78-41-31 DDDDD1.

LOCATION.--Lat $41^{\circ}30'24''$, long $95^{\circ}35'39''$, Hydrologic Unit 10230006, approximately 4.5 mi south of the Town of Persia and west of Iowa Highway 191 to the north of the Tri-County High School. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 129 ft, cased to 129 ft, slotted 109-119 ft, gravel-packed. Open to Pennsylvanian shale and limestone 118-129 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,158 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.05 ft above land-surface datum.

REMARKS.--Well WC-27.

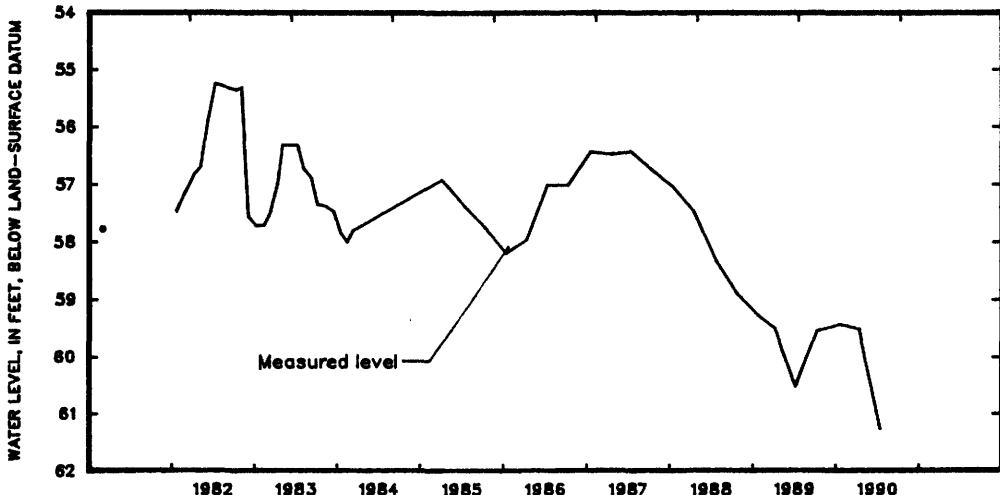
PERIOD OF RECORD.--January 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 55.26 ft below land-surface datum, July 7, 1982; lowest measured, 61.29, July 13, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	59.56	JAN 12	59.44	APR 12	59.55	JUL 13	59.25
WATER YEAR 1990	HIGHEST	59.25	JUL 13, 1990	LOWEST	59.56	OCT 06, 1989	

413024095353901



413523095483101. Local number, 78-45-05 ACDD1.

LOCATION.--Lat $41^{\circ}35'23''$, long $95^{\circ}48'31''$, Hydrologic Unit 10230007, approximately 3.25 mi south of the Town of Logan and 1.5 mi east of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 179 ft, cased to 179 ft, slotted 168-175 ft, gravel-packed. Open to Pennsylvanian shale 175-179 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,080 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.35 ft above land-surface datum.

REMARKS.--Well WC-33.

PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 66.90 ft below land-surface datum, March 21, 1990; lowest measured, 74.90 ft below land-surface datum, February 16, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 08	73.80	MAR 21	66.2	MAY 09	73.32	JUL 23	73.9
DEC 15	73.8	APR 24	69.82	JUN 06	73.3	SEP 04	73.69 S
FEB 02	74.1						
WATER YEAR 1990	HIGHEST	66.2	MAR 21, 1990	LOWEST	74.1	FEB 02, 1990	

HARRISON COUNTY

413524095490601. Local number, 78-43-05 BCDD1.

LOCATION.--Lat $41^{\circ}35'24''$, long $95^{\circ}49'06''$, Hydrologic Unit 10230007, approximately 2 mi north and 3.5 mi east of the Town of Missouri Valley and 1 mi east of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 51 ft, cased to 51 ft, slotted 48-51 ft, gravel-packed.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,010 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.40 ft above land-surface datum.

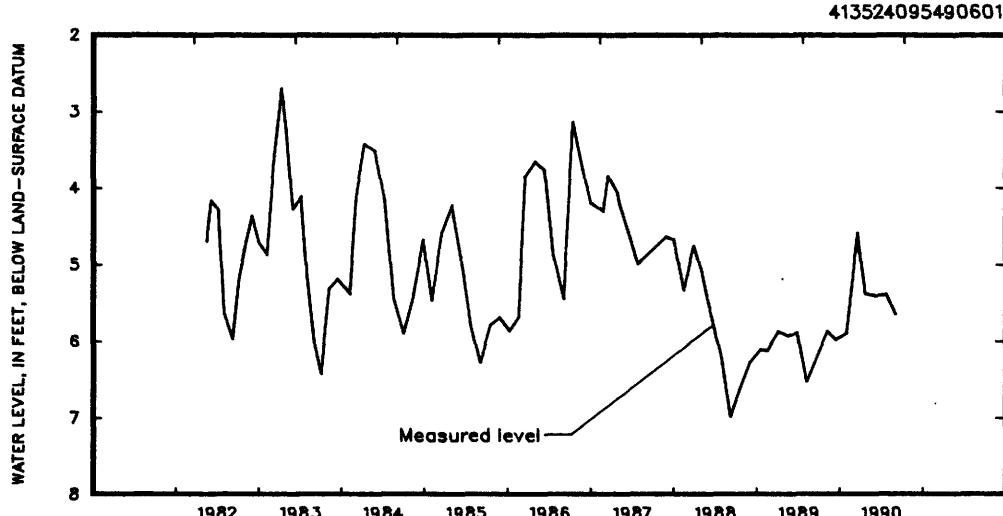
REMARKS.--Well WC-32.

PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.71 ft below land-surface datum, April 12, 1983; lowest measured, 7.00 ft below land-surface datum, September 9, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 08	5.88	FEB 02	5.9	APR 24	5.4	JUL 23	5.4
DEC 15	6.0	MAR 21	4.6	JUN 06	5.43	SEP 04	5.67
WATER YEAR 1990	HIGHEST	4.6	MAR 21, 1990	LOWEST	6.0	DEC 15, 1989	



413838095462001. Local number, 79-42-19 AADB1.

LOCATION.--Lat $41^{\circ}38'38''$, long $95^{\circ}46'20''$, Hydrologic Unit 10230007, approximately 0.5 mi east of the Town of Logan, north of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Mississippian: in dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 628 ft, cased to 628 ft, perforated 588-628 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,045 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.40 ft above land-surface datum.

REMARKS.--Well WC-22.

PERIOD OF RECORD.--November 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.33 ft above land-surface datum, June 9, 1987; lowest measured, 16.37 ft below land-surface datum, June 3, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 08	2.58	FEB 02	2.6	APR 24	2.6	JUL 24	3.58
DEC 15	2.8	MAR 20	2.8	JUN 06	3.2	SEP 04	3.29
WATER YEAR 1990	HIGHEST	2.58	NOV 08, 1989	LOWEST	3.58	JUL 24, 1990	

HARRISON COUNTY

413836095465502. Local number, 79-42-19 BADC2.
 LOCATION.--Lat 41°38'36", long 95°46'55", Hydrologic Unit 10230007, approximately 0.25 mi east of the Town of Logan, north of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.
 WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 5 in., depth 49 ft, cased to 49 ft, slotted 31-49 ft, gravel-packed.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,030 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.40 ft above land-surface datum.

REMARKS.--Well WC-196.

PERIOD OF RECORD.--June 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.36 ft below land-surface datum, May 30, 1984; lowest measured, 14.73 ft below land-surface datum, December 20, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 08	14.12	FEB 08	10.2	JUN 06	10.3	SEP 06	11.04
DEC 20	14.73	MAR 21	9.1	JUL 17	10.3		
			HIGHEST	9.1	MAR 21, 1990	LOWEST	14.73 DEC 20, 1989

414226095435002. Local number, 80-42-27 CCBA2.

LOCATION.--Lat 41°42'26", long 95°43'50", Hydrologic Unit 10230007, approximately 2 mi south and 1.5 mi west of the Town of Woodbine, west of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 41 ft, cased to 40 ft, slotted 35-40 ft, gravel-packed, open hole 40-41 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,050 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.80 ft above land-surface datum.

REMARKS.--Well WC-192.

PERIOD OF RECORD.--June 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.26 ft below land-surface datum, June 13, 1986; lowest measured, 14.27 ft below land-surface datum, August 9, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 08	13.92	FEB 02	14.0	APR 24	12.5	JUL 23	11.7
DEC 15	14.08	MAR 21	12.64	JUN 06	12.11	SEP 04	12.55
			HIGHEST	11.7	JUL 23, 1990	LOWEST	14.08 DEC 15, 1989

414228095442301. Local number, 80-42-28 DBCD1.

LOCATION.--Lat 41°42'28", long 95°44'23", Hydrologic Unit 10230007, approximately 2 mi south and 1.75 mi west of the Town of Woodbine, west of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 53 ft, cased to 52 ft, slotted 46-52 ft, gravel-packed, open hole 52-53 ft. Open to Pennsylvanian shale 51-53 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,060 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.00 ft above land-surface datum.

REMARKS.--Well WC-37.

PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.75 ft below land-surface datum, April 12, 1983; lowest measured, 24.50 ft below land-surface datum, February 2, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 08	21.97	FEB 02	24.5	APR 24	21.4	JUL 23	21.17
DEC 15	22.32	MAR 21	21.0	JUN 06	21.08	SEP 04	20.33
			HIGHEST	20.33	SEP 04, 1990	LOWEST	24.5 FEB 02, 1990

HARRISON COUNTY

414213095431602. Local number, 80-42-34 ABBB2.

LOCATION.--Lat 41° 42' 13", long 95° 43' 16", Hydrologic Unit 10230007, approximately 2 mi south of the Town of Woodbine and 1 mi west of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 37 ft, cased to 37 ft, slotted 32-37 ft, gravel-packed.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,045 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.30 ft above land-surface datum.

REMARKS.--Well WC-191.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.08 ft below land-surface datum, October 14, 1986; lowest measured, 7.20 ft below land-surface datum, September 9, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
NOV 08	6.34	DEC 15	6.25	FEB 02	6.35	MAR 21	4.95
APR 24	4.91	JUN 06	6.23	JUL 23	5.6	SEP 04	6.53

WATER YEAR 1990 HIGHEST 4.91 APR 24, 1990 LOWEST 6.53 SEP 04, 1990

414149095422401. Local number, 80-42-35 BDCC1.

LOCATION.--Lat 41° 41' 49", long 95° 42' 24", Hydrologic Unit 10230007, approximately 3 mi south of the Town of Woodbine, on the west side of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 120 ft, cased to 118 ft, slotted 103-105 ft, gravel-packed, open hole 118-120 ft. Open to Pennsylvanian shale 112-120 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,140 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.70 ft above land-surface datum.

REMARKS.--Well WC-193.

PERIOD OF RECORD.--June 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 48.96 ft below land-surface datum, October 16, 1987; lowest measured, 58.30 ft below land-surface datum, March 21, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
NOV 08	54.28	FEB 02	57.3	APR 24	57.23	JUL 23	51.8
DEC 15	56.4	MAR 21	58.3	JUN 06	55.3	SEP 04	54.76

WATER YEAR 1990 HIGHEST 51.8 JUL 23, 1990 LOWEST 58.3 MAR 21, 1990

415124095361501. Local number, 81-41-03 ACCC1.

LOCATION.--Lat 41° 51' 24", long 95° 36' 15", Hydrologic Unit 10230007, in the northwest part of the Town of Dunlap, south of Iowa Highway 37 and west of U.S. Highway 30, adjacent to the Illinois Central Gulf Railroad. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 61 ft, cased to 46 ft, slotted 40-46 ft, gravel-packed, open hole 46-61 ft. Open to Pennsylvanian shale, sandstone, and lignite 50-61 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,095 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.95 ft above land-surface datum.

REMARKS.--Well WC-189.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.14 ft below land-surface datum, May 30, 1984; lowest measured, 15.59 ft below land-surface datum, August 9, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
NOV 08	15.29	FEB 02	15.19	APR 24	14.9	JUL 23	14.0
DEC 15	15.4	MAR 21	13.77	JUN 06	13.3	SEP 04	14.01

WATER YEAR 1990 HIGHEST 13.3 JUN 06, 1990 LOWEST 15.4 DEC 15, 1989

GROUND-WATER LEVELS

HARRISON COUNTY

415109095363201. Local number, 81-41-03 CDBB1.

LOCATION.--Lat 41°51'09", long 95°36'32", Hydrologic Unit 10230007, in the southwest part of the Town of Dunlap, 0.25 mi west of U.S. Highway 30 and north of County Road F-14. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 50 ft, cased to 40 ft, slotted 35-40 ft, gravel-packed, open hole 40-50 ft. Open to Cretaceous sandstone 40-50 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.40 ft above land-surface datum.

REMARKS.--Well WC-190.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.14 ft below land-surface datum, May 30, 1984; lowest measured, 13.22 ft below land-surface datum, December 15, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 08	12.18	FEB 02	13.1	APR 24	12.94	JUL 23	11.18
DEC 15	13.3	MAR 21	12.6	JUN 06	13.43	SEP 04	11.57

WATER YEAR 1990 HIGHEST 11.18 JUL 23, 1990 LOWEST 13.43 JUN 06, 1990

415003095382301. Local number, 81-41-17 ABAA1.

LOCATION.--Lat 41°50'03", long 95°38'23", Hydrologic Unit 10230007, 2.5 mi southwest of the Town of Dunlap, 1 mi west of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 166 ft, cased to 166 ft, slotted from 149-166 ft, gravel-packed. Open to Pennsylvanian shale 158-166 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,135 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.40 ft above land-surface datum.

REMARKS.--Well WC-11.

PERIOD OF RECORD.--June 1981 to current year.

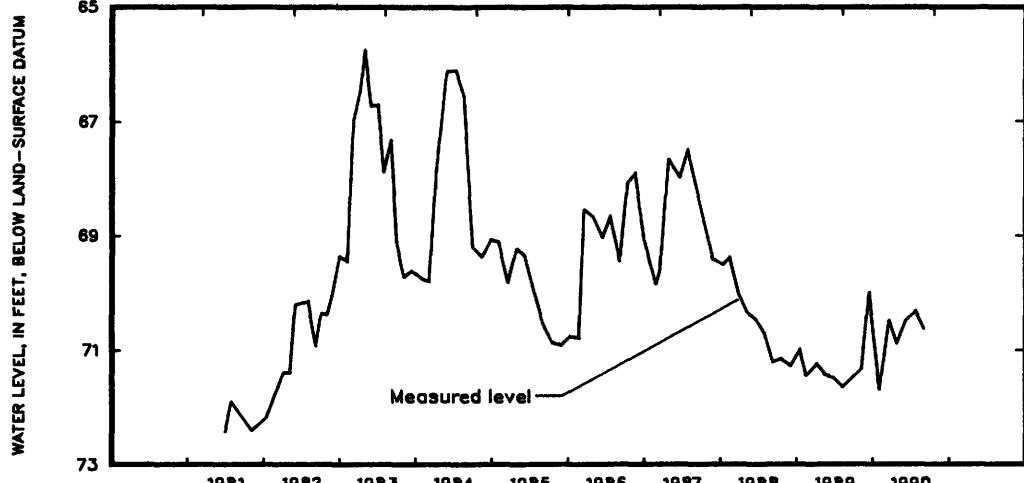
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 65.77 ft below land-surface datum, May 3, 1983; lowest measured, 72.45 ft below land-surface datum, June 26, 1981.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 08	71.33	FEB 02	71.71	APR 24	70.9	JUL 23	70.33
DEC 15	70.01	MAR 21	70.5	JUN 06	69.5	SEP 04	70.66

WATER YEAR 1990 HIGHEST 69.5 JUN 06, 1990 LOWEST 71.71 FEB 02, 1990

415003095382301



HARRISON COUNTY

414702095395101. Local number, 81-41-31 BDDDI.

LOCATION.--Lat $41^{\circ}47'02''$, long $95^{\circ}39'51''$, Hydrologic Unit 10230007, approximately 4 mi northeast of the Town of Woodbine, on the east side of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 30 ft, cased to 30 ft, slotted 24-30 ft, gravel-packed.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,065 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.90 ft above land-surface datum.

REMARKS.--Well WC-53.

PERIOD OF RECORD.--June 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.61 ft below land-surface datum, May 3, 1983; lowest measured, 12.51 ft below land-surface datum, August 9, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 08	12.65	FEB 02	10.96	APR 24	11.28	JUL 23	7.93
DEC 15	12.4	MAR 21	10.6	JUN 06	10.3	SEP 04	9.66

WATER YEAR 1990 HIGHEST 7.93 JUL 23, 1990 LOWEST 12.65 NOV 08, 1989

414700095373001. Local number, 81-41-33 CAAA1.

LOCATION.--Lat $41^{\circ}47'00''$, long $95^{\circ}37'30''$, Hydrologic Unit 10230007, approximately 4.5 mi south of the Town of Dunlap, and 2 mi east of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 169 ft, cased to 155 ft, slotted 145-154 ft, gravel-packed.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,182 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.90 ft above land-surface datum.

REMARKS.--Well WC-52.

PERIOD OF RECORD.--June 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 72.54 ft below land-surface datum, July 27, 1987; lowest measured, 85.03 ft below land-surface datum, June 4, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 08	78.29	FEB 02	78.1	APR 24	80.73	JUL 23	78.96
DEC 15	78.5	MAR 21	79.0	JUN 06	78.9	SEP 04	76.23

WATER YEAR 1990 HIGHEST 76.23 SEP 04, 1990 LOWEST 80.73 APR 24, 1990

415148095545001. Local number, 81-44-01 ABAB1.

LOCATION.--Lat $41^{\circ}51'48''$, long $95^{\circ}54'50''$, Hydrologic Unit 10230001, approximately 2 mi north of the Town of Pisgah on the west side of Iowa Highway 183. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Soldier alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 61 ft, cased to 58 ft, slotted 53-58 ft, gravel packed, open hole 58-61 ft. Pleistocene glacial drift 57-61 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,065 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.80 ft above land-surface datum.

REMARKS.--Well WC-177.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.13 ft below land-surface datum, April 11, 1984; lowest measured, 12.12 ft below land-surface datum, October 17, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	11.60	JAN 12	11.63	APR 10	10.70	JUL 11	9.60

WATER YEAR 1990 HIGHEST 9.60 JUL 11, 1990 LOWEST 11.63 JAN 12, 1990

GROUND-WATER LEVELS

HARRISON COUNTY

414955096000601. Local number, 81-44-18 AADA1.

LOCATION.--Lat $41^{\circ}49'55''$, long $96^{\circ}00'06''$, Hydrologic Unit 10230003, approximately 1.8 mi northeast of the Town of Little Sioux, just west of Iowa Highway 301. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Pennsylvanian: in sandstone of Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 126 ft, cased to 126 ft, perforated 108-126 ft, gravel-packed. Open to Pleistocene glacial drift 108-112 ft. Original depth 209 ft, casing plugged at 126 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,075 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.80 ft above land-surface datum.

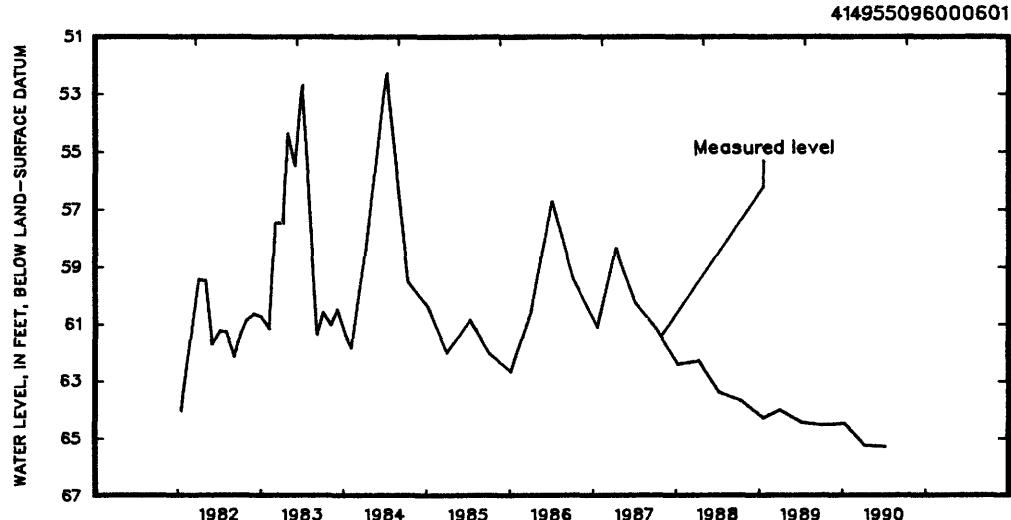
REMARKS.--Well WC-23.

PERIOD OF RECORD.--January 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 52.33 ft below land-surface datum, July 12, 1984; lowest measured, 65.30 ft below land-surface datum, April 10, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	64.59	JAN 12	64.51	APR 10	65.30	JUL 11	62.54
WATER YEAR 1990	HIGHEST	62.54	JUL 11, 1990	LOWEST	65.30	APR 10, 1990	



HENRY COUNTY

405810091330502. Local number, 71-06-09 ABAC2.

LOCATION.--Lat $40^{\circ}58'10''$, long $91^{\circ}33'05''$, Hydrologic Unit 07080107, in the city water plant on Adams Street, Mount Pleasant. Owner: City of Mount Pleasant.

AQUIFER.--Cambrian-Ordovician: in sandstone and sandy dolomite of Late Cambrian and Early Ordovician age.

WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 20 to 19 in., depth 1,860 ft, cased to 623 ft, open hole 623-1,860 ft. Open from the Middle Devonian Cedar Valley Formation into the Late Cambrian St. Lawrence Formation.

METHOD.--Quarterly airline measurement by personnel from the City of Mt. Pleasant, checked by USGS personnel.

DATUM.--Elevation of land-surface datum is 725 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Hole in pump base, 2.25 ft above land-surface datum.

REMARKS.--City well No. 4. Water levels affected by pumping.

PERIOD OF RECORD.--April 1946 to December 1950, January 1953 to March 1957 and May 1959 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 132.00 ft below land-surface datum, May 5, 1946; lowest measured, nonpumping, 208.25 ft below land-surface datum, February 25, 1987.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
OCT 04	232.25	MAR 12	232.67	JUN 04	237.29	AUG 30	234.98
DEC 18	230.36						

WATER YEAR 1990 HIGHEST 230.36 DEC 18, 1989 LOWEST 237.29 JUN 04, 1990

p Well being pumped.

HENRY COUNTY

405741091334501. Local number, 71-06-09 CBCA1.
 LOCATION.--Lat $40^{\circ}57'41''$, long $91^{\circ}33'45''$, Hydrologic Unit 07080107, at Saunders Park in the southwest part of Mount Pleasant. Owner: City of Mount Pleasant.
 AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian and sandy dolomite of Early Ordovician age.
 WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 16 to 6 in., depth 1,896 ft, cased to 1,689 ft, open hole 1,689-1,896 ft. Well deepened from 1,802 ft to 1,896 ft in 1955.
 METHOD.--Quarterly airline measurement by personnel from the City of Mt. Pleasant, checked by USGS personnel.
 DATUM.--Elevation of land-surface datum is 670 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.32 ft below land-surface datum.
 REMARKS.--City well No. 3. Water levels affected by pumping.
 PERIOD OF RECORD.--September 1945 to February 1958 and November 1961 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 71.60 ft below land-surface datum, December 31, 1945; lowest measured (pumping), 259.32 ft below land-surface datum, January 1981.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	220.32	MAR 12	230.77	JUN 04	235.39	AUG 27	205.32
DEC 18	216.91						
WATER YEAR 1990		HIGHEST	205.32	AUG 27, 1990		LOWEST	235.39
					JUN 04, 1990		

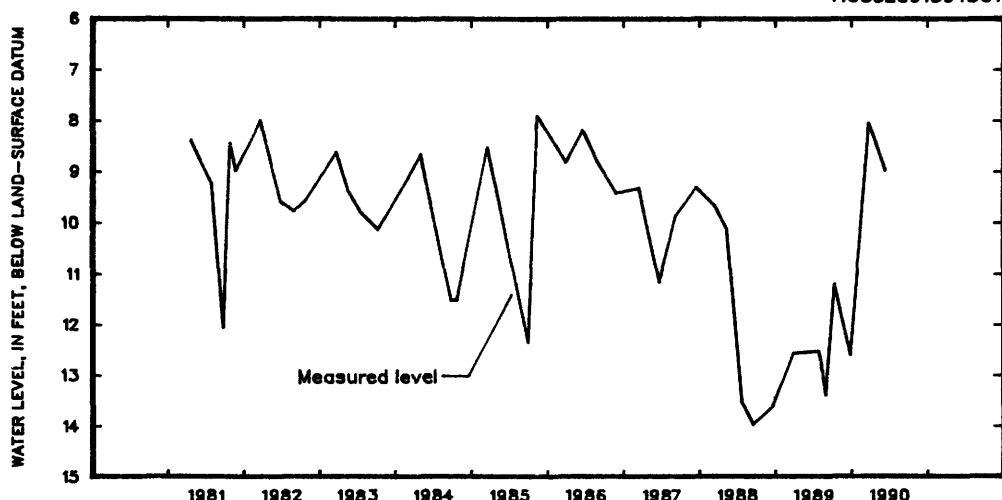
p Well being pumped.

410852091394301. Local number, 73-07-09 AABD1.
 LOCATION.--Lat $41^{\circ}08'52''$, long $91^{\circ}39'43''$, Hydrologic Unit 07080107, north of Main Street near the water tower, Wayland. Owner: Town of Wayland.
 AQUIFER.--Glacial drift: in material of Pleistocene age.
 WELL CHARACTERISTICS.--Dug unused water-table well, diameter 4 ft, depth 52 ft. Casing information not available.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 735 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of cement cover, 0.21 ft above land-surface datum.
 REMARKS.--None.
 PERIOD OF RECORD.--September 1960 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.30 ft below land-surface datum, September 1, 1965; lowest measured, 14.69 ft below land-surface datum, February 15, 1977.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	11.23	DEC 20	12.64	MAR 20	8.09	JUN 06	9.03
WATER YEAR 1990		HIGHEST	8.09	MAR 20, 1990		LOWEST	12.64
					DEC 20, 1989		

410852091394301



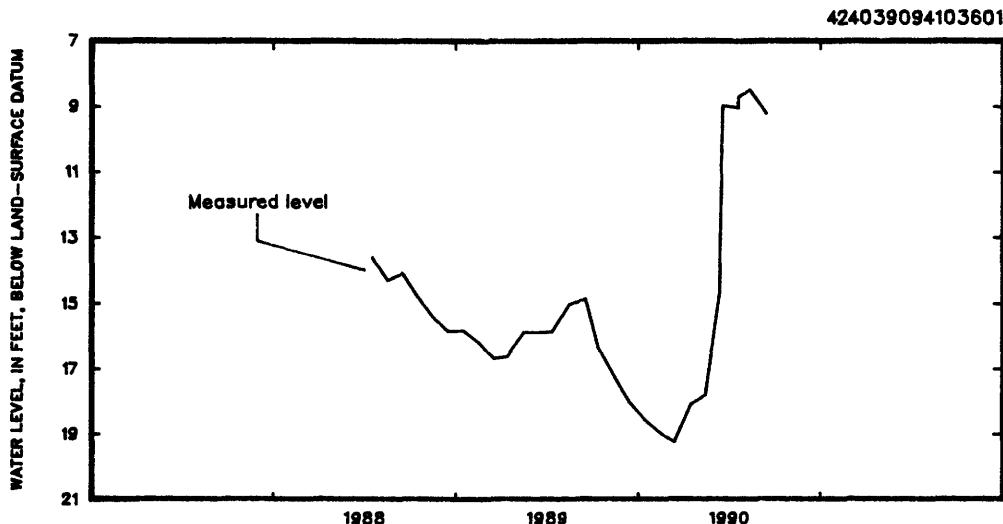
GROUND-WATER LEVELS

HUMBOLDT COUNTY

424039094103601. Local number, 91-28-20 CAAA.
 LOCATION.--Lat $42^{\circ}40'39''$, long $94^{\circ}10'36''$, Hydrologic Unit 07100004, approximately 3 mi south of the Town of Dakota City, on the west side of County Road P-56. Owner: Elmer Gravlund.
 AQUIFER.--Glacial drift; in material of Pleistocene age.
 WELL CHARACTERISTICS.--Unused water-table well, diameter 3 ft, cribbed with field stone, depth 24.5 ft, casing information unavailable.
 METHOD.--Monthly measurement with chalked tape or electric line by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,135 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, at land-surface datum.
 REMARKS.--None.
 PERIOD OF RECORD.--July 1988 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.53 ft below land-surface datum, August 10, 1990; lowest measured, 19.29 ft below land-surface datum, March 12, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	16.39	FEB 12	19.01	JUN 11	14.72	AUG 10	8.53
NOV 13	17.32	MAR 12	19.29	17	9.01	SEP 13	9.29
DEC 12	18.06	APR 14	18.12	JUL 18	9.12		
JAN 12	18.60	MAY 14	17.82	19	8.74		
WATER YEAR 1990		HIGHEST	8.53	AUG 10, 1990		LOWEST	19.29 MAR 12, 1990



IDA COUNTY

422215095390811. Local number, 87-41-05 CCCC11.
 LOCATION.--Lat $42^{\circ}22'15''$, long $95^{\circ}39'08''$, Hydrologic Unit 10230005, approximately 0.75 mi east and 6.5 mi south of the Village of Cushing. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Dakota; in sandstone of Cretaceous age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 490 ft, cased to 490 ft, perforated 301-305 ft. Original depth 510 ft, cemented back to 490 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,344 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.72 ft above land-surface datum.
 REMARKS.--Well D-10.
 PERIOD OF RECORD.--June 1980 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 202.55 ft below land-surface datum, June 4, 1980; lowest measured, 206.50 ft below land-surface datum, May 7, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	206.38	JAN 10	206.42	APR 11	206.33	JUL 12	205.86
WATER YEAR 1990		HIGHEST	205.86	JUL 12, 1990		LOWEST	206.42 JAN 10, 1990

IDA COUNTY

423107095383201. Local number, 89-41-13 CCCC1.
 LOCATION.--Lat 42°31'07", long 95°38'32", Hydrologic Unit 10230003, at a roadside park on County Road D-15, approximately 1.5 mi east and 3.5 mi north of the Village of Cushing. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Mississippian: in limestone of Mississippian age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 469 ft, cased to 465 ft, sand point 465-468 ft, open hole 468-469 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,320 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.11 ft above land-surface datum.
 REMARKS.--Well D-9.
 PERIOD OF RECORD.--December 1978 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 186.45 ft below land-surface datum, July 27, 1983; lowest measured, 244.55 ft below land-surface datum, July 9, 1980.
 REVISION.--Lowest water level measured, 244.55 ft below land-surface datum, July 9, 1980.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	191.53	JAN 10	191.86	APR 11	191.89	JUL 12	191.57
			HIGHEST 191.53	OCT 04, 1989		LOWEST 191.89	APR 11, 1990

IOWA COUNTY

414709091515801. Local number, 81-09-35 BCAA1.
 LOCATION.--Lat 41°47'09", long 91°51'58", Hydrologic Unit 07080208, approximately 400 ft northwest of the Iowa River, east of Iowa Highway 149, and approximately 1.1 mi south of the Village of Amana. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Iowa alluvial: in sand and gravel of Holocene age.
 WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 10 in., depth 27 ft, cased to 18 ft, screened 18-27 ft.
 INSTRUMENTATION.--Water-level recorder.
 DATUM.--Elevation of land-surface datum is 710 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.0 ft above land-surface datum.
 REMARKS.--Well IRA-24.
 PERIOD OF RECORD.--December 1984 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 2.90 ft below land-surface datum, February 24, 1985; lowest recorded, 12.45 ft below land-surface datum, December 31, 1988, and January 3, 1989.

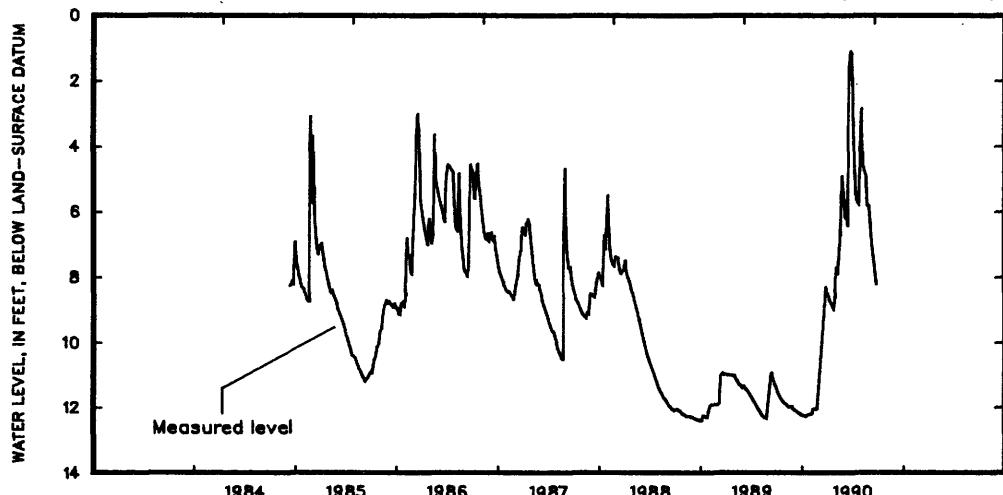
WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
NOON VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	-----	11.95	12.14	12.30	12.23	-----	8.63	7.74	-----	2.45	2.88	6.38
10	-----	12.00	12.16	12.30	12.08	-----	8.77	7.94	5.72	4.64	4.64	6.99
15	-----	12.04	12.19	12.33	12.07	-----	8.85	7.40	6.47	5.51	5.09	-----
20	-----	-----	12.23	12.27	12.10	-----	8.95	6.73	1.70	5.76	5.51	-----
25	11.87	-----	12.23	12.25	12.07	-----	9.04	4.95	1.13	5.83	5.83	-----
EOM	11.93	12.10	12.28	12.24	-----	8.34	8.64	-----	1.23	4.30	4.30	-----

WTR YEAR 1989 HIGHEST 1.13 JUN 25, 1990 LOWEST 12.33 JAN 15, 1990

a Recorded water level has been adjusted.

414709091515801



GROUND-WATER LEVELS

IOWA COUNTY

414930092093801. Local number, 81-11-17 CBBC1.
 LOCATION.--Lat 41°49'30", long 92°09'38", Hydrologic Unit 07080208, approximately 2.2 mi east of the Village of Koszta and 0.5 mi south of the Iowa River. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Iowa alluvial: in sand and gravel of Holocene age.
 WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 30 ft, cased to 27 ft, screened 27-30 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.60 ft above land-surface datum.

REMARKS.--Well IRA-6. Replaces well IRA 10-B. Records for 1984 to July 1986 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.64 ft below land-surface datum, May 28, 1986; lowest measured, 10.55 ft below land-surface datum, January 3, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	9.67	JAN 26	10.20	APR 30	7.24	JUN 15	5.93
NOV 27	10.02	MAR 28	7.07	JUN 07	6.69	AUG 20	5.59
DEC 27	10.16						
WATER YEAR 1990		HIGHEST	5.59	AUG 20, 1990		LOWEST	10.20
						JAN 26, 1990	

414816092053401. Local number, 81-11-23 DCCC1.
 LOCATION.--Lat 41°48'16", long 92°05'34", Hydrologic Unit 07080208, approximately 0.75 mi west of the Town of Marengo, 0.5 mi north of Iowa Highway 212 and 0.5 mi south of the Iowa River. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Iowa alluvial: in sand and gravel of Holocene age.
 WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 31 ft, cased to 28 ft, screened 28-31 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.30 ft above land-surface datum.

REMARKS.--Well IRA-4A. Replaces well IRA-10A. Records for 1984 to July 1986 are available in the files of the Iowa District Office.

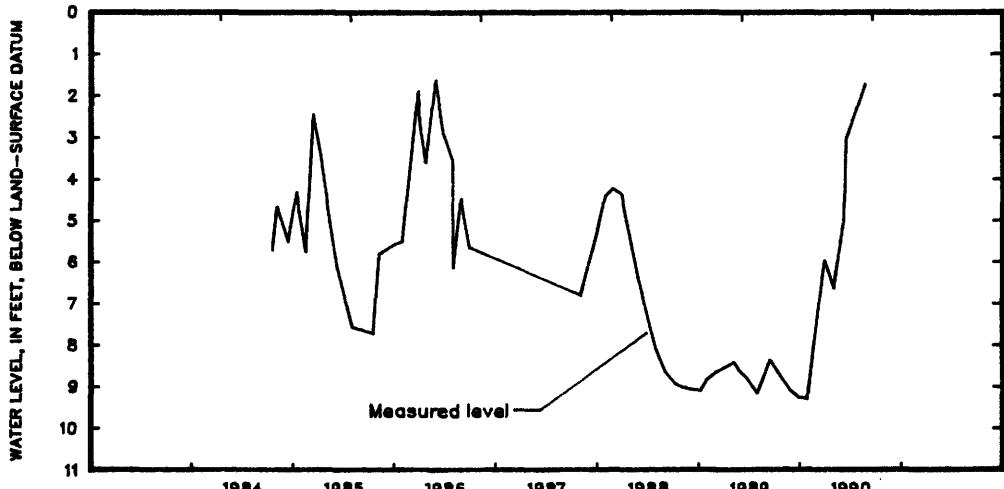
PERIOD OF RECORD.--October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.65 ft below land-surface datum, May 28, 1986; lowest measured, 9.33 ft below land-surface datum, January 26, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	8.67	JAN 26	9.33	APR 30	6.67	JUN 15	3.02
NOV 27	9.14	MAR 28	5.99	JUN 07	5.00	AUG 20	1.75
DEC 27	9.30						
WATER YEAR 1990		HIGHEST	1.75	AUG 20, 1990		LOWEST	9.33
						JAN 26, 1990	

414816092053401



IOWA COUNTY

415125092164201. Local number, 81-12-06 ADDA1.

LOCATION.--Lat 41°51'25", long 92°16'42", Hydrologic Unit 07080208, approximately 800 ft south of the Iowa River, west side of Iowa Highways 21 and 212, approximately 2 mi south of the Town of Belle Plaine. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Iowa alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS--Drilled observation water-table well.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 36 ft, cased to 33 ft, screened 33-36 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.

METHOD.--Monthly measurements.
DATUM.--Elevation of 1

DATUM.--Elevation of land-surface datum is 765 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.60 ft above land-surface datum.
REMARKS.--Well IRA-14.

PERIOD OF RECORD.--October 1984

PERIOD OF RECORD: October 1964 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level

1986; lowest measured, 13.47 ft below land-surface datum, July 27, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	13.28	JAN 26	13.31	APR 30	11.14	JUN 15	8.51
NOV 27	13.43	MAR 28	10.33	JUN 07	10.29	AUG 20	6.83
DEC 27	13.28						
WATER YEAR 1990		HIGHEST	6.83	AUG 20, 1990	LOWEST	13.43	NOV 27, 1989

JACKSON COUNTY

420842090165701. Local number, 85-6E-29 ACAD1

LOCATION.--Lat 42°08'42" long 90°16'57". Hydrologic Unit 07060005, 1 mi east of U.S. Highway 52, 2 mi southeast of the Village of Green Island beside the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks in the Upper Mississippi River Wildlife and Fish Refuge. Owner: U.S. Geological Survey.

AQUIFER.--Dresbach; in Mt. Simon sandstone of Early Cambrian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in. depth 1,804 ft., cased to
1,705 ft., screened 1,705-1,725 ft., open hole 1,725-1,804 ft.
METHOD.--Methane gas was used as tracer, U.S.G.S. method.

METHOD.--Monthly measurement with engineer's rule by USGS personnel.

DATUM.--Elevation of land-surface datum is 610 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Mark on angle iron attached to well house, 6.05 ft above land-surface datum.

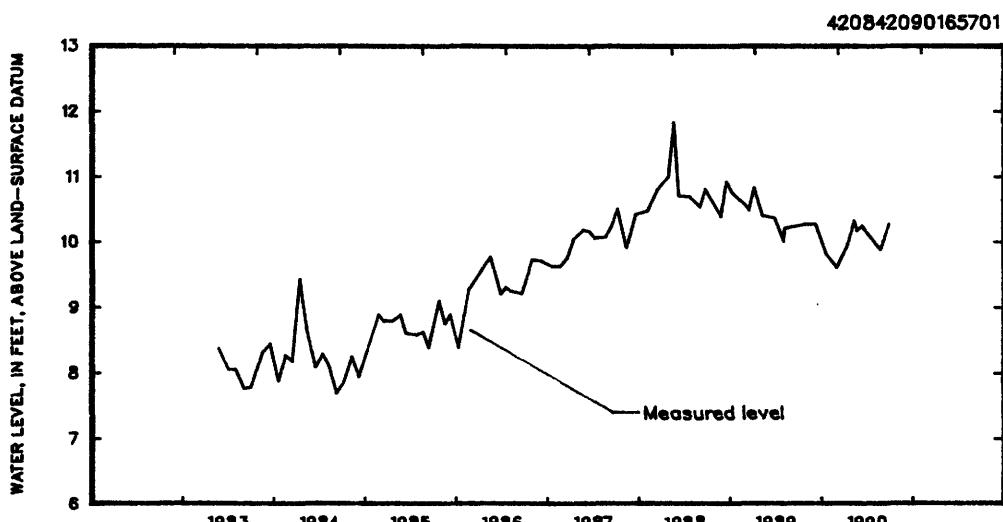
REMARKS.--Flowing well. Green Island #1.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.81 ft above land-surface datum, May 16, 1988; lowest measured, 7.67 ft above land-surface datum, September 6, 1984.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
 (MEASUREMENTS ABOVE LAND SURFACE INDICATED BY "+")

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL		
OCT 24	+10.25	FEB 28	+9.58	MAY 20	+10.15	AUG 22	+9.85		
DEC 06	+10.25	APR 12	+9.93	JUL 10	+10.22	SEP 25	+10.25		
JAN 17	+9.78	MAY 09	+10.30						
WATER YEAR 1990		HIGHEST	+10.30	MAY 09	1990	LOWEST	+9.58	MAY 09	1990



GROUND-WATER LEVELS

JACKSON COUNTY

420842090165703. Local number, 85-6E-29 ACAD3.

LOCATION.--Lat 42°08'42", long 90°16'57", Hydrologic Unit 07060005, 1 mi east of U.S. Highway 52, 2 mi southeast of the Village of Green Island beside the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks in the Upper Mississippi River Wildlife and Fish Refuge. Owner: U.S. Geological Survey.

AQUIFER.--Cambrian-Ordovician: in Prairie du Chien dolomite of Early Ordovician age and St. Peter sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 910 ft, cased to 604.2 ft, screened 604.2-624.2 ft, open hole 624.2-910 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 610 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

REMARKS.--Green Island #3.

PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.19 ft below land-surface datum, January 8, 1986; lowest measured 9.90 ft below land-surface datum, August 31, 1983.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	8.05	FEB 28	8.26	MAY 22	8.25	AUG 22	7.88
DEC 06	7.80	APR 12	7.94	JUL 10	7.54	SEP 25	7.76
JAN 17	7.20	MAY 09	7.41				
WATER YEAR 1990	HIGHEST	7.20	JAN 17, 1990	LOWEST	8.26	FEB 28, 1990	

420842090165704. Local number, 85-6E-29 ACAD4.

LOCATION.--Lat 42°08'42", long 90°16'57", Hydrologic Unit 07060005, 1 mi east of U.S. Highway 52, 2 mi southeast of the Village of Green Island beside the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks in the Upper Mississippi River Wildlife and Fish Refuge. Owner: U.S. Geological Survey.

AQUIFER.--Cambrian-Ordovician: in Galena dolomite of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 400 ft, cased to 299.6 ft, screened 299.6-319.6 ft, open hole 319.6-400 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 610 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

REMARKS.--Green Island #4.

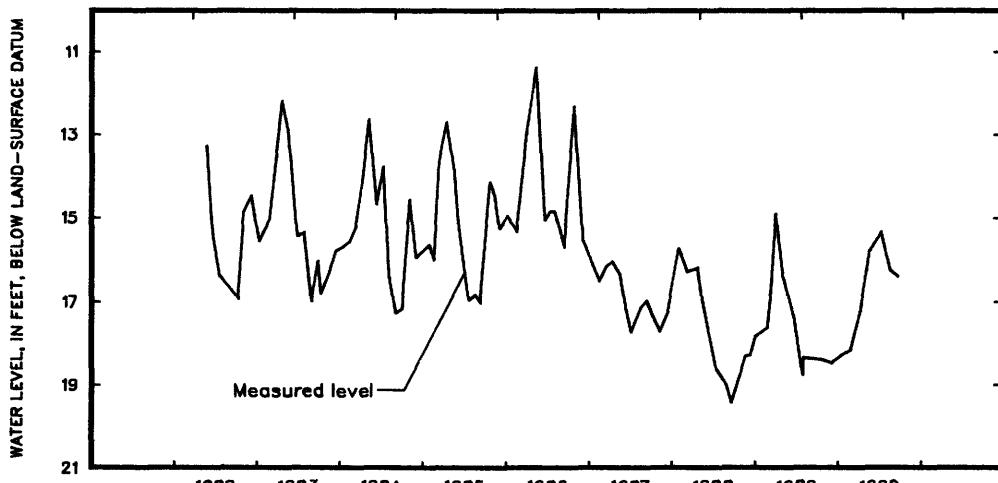
PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.40 ft below land-surface datum May 15, 1986; lowest measured, 19.46 ft below land-surface datum, September 20, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	18.42	FEB 28	18.17	MAY 22	15.79	AUG 22	16.29
DEC 06	18.50	APR 12	17.23	JUL 10	15.36	SEP 25	16.44
JAN 17	18.30	MAY 09	16.27				
WATER YEAR 1990	HIGHEST	15.36	JUL 10, 1990	LOWEST	18.50	DEC 06, 1989	

420842090165704



JASPER COUNTY

414210092592001. Local number, 80-18-31 ABBB1.

LOCATION.--Lat $41^{\circ}42'10''$, long $92^{\circ}59'20''$, Hydrologic Unit 07080105, approximately 3 mi east of the City of Newton just south of U.S. Highway 6. Owner: P.W. Beukema.

AQUIFER.--Glacial drift; in material of Pleistocene age.

WELL CHARACTERISTICS.--Dug stock water-table well, diameter 36 in., depth 37 ft, cribbed with brick.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 940 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of cement platform, 0.70 ft above land-surface datum.

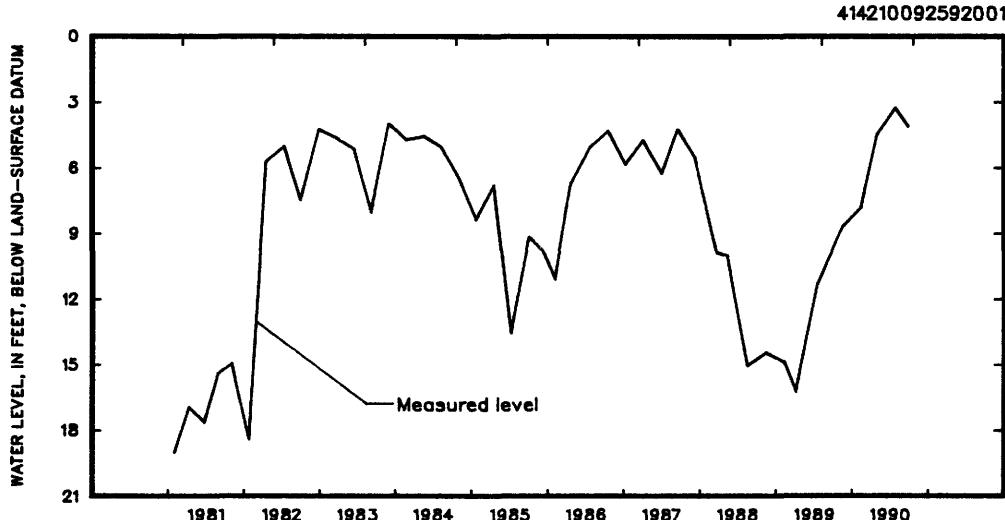
REMARKS.--None.

PERIOD OF RECORD.--February 1940 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.67 ft below land-surface datum, June 10, 1947; lowest measured, 27.15 ft below land-surface datum, December 18, 1948.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	8.75	MAY 03	4.50	JUL 26	3.33	SEP 27	4.20
FEB 15	7.86						
WATER YEAR 1990	HIGHEST	3.33	JUL 26, 1990	LOWEST	8.75	NOV 16, 1989	



414147093035401. Local number, 80-19-33 ACAC1.

LOCATION.--Lat $41^{\circ}41'50''$, long $93^{\circ}03'53''$, Hydrologic Unit 07080105, 231 West 10th Street, Newton. Owner: John Coppess.

AQUIFER.--Cambrian-Ordovician: in sandstone and sandy dolomite of Late Cambrian and Early Ordovician age. WELL CHARACTERISTICS.--Drilled unused private artesian water well, diameter 12 to 6 in., depth 2,567 ft, cased to 1,750 ft, open hole 1,750-2,567 ft. Open to 461 ft of Early Ordovician Prairie du Chien formation, 262 ft of Late Cambrian St. Lawrence formation, and 94 ft of Middle Cambrian Franconia formation.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 915 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in cement well cover, 0.50 ft above land-surface datum.

REMARKS.--None.

PERIOD OF RECORD.--September 1963 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 98.43 ft below land-surface datum, June 14, 1966; lowest measured, 272.07 ft below land-surface datum, July 20, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	259.92	MAY 03	249.69	JUL 26	263.17	SEP 27	267.26
FEB 15	257.22						
WATER YEAR 1990	HIGHEST	249.69	MAY 03, 1990	LOWEST	267.26	SEP 27, 1990	

JOHNSON COUNTY

414107091322901. Local number, 79-06-04 AAAA1.
 LOCATION.--Lat 41°41'07", long 91°32'29", Hydrologic Unit 07080209, at Forest View Trailer Court, northern edge of Iowa City. Owner: Forest View Trailer Court.
 AQUIFER.--Silurian: in limestone of Silurian age.
 WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 280 ft, cased to 96 ft, open hole 96-280 ft.
 METHOD.--Monthly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 735 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to top of casing, 1.62 ft above land-surface datum.
 REMARKS.--Water levels affected by wells in the area pumping in late spring, summer, and early fall. Water-level recorder removed October 1986.
 PERIOD OF RECORD.--May 1971 to current year.
 REVISED RECORDS.--WDR IA-84-1.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 96.93 ft below land-surface datum, March 23, 1979; lowest measured, 148.60 ft below land-surface datum, August 2, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	148.24	JAN 02	134.67	MAY 15	140.41	JUL 09	146.57
NOV 16	147.46	MAR 02	125.63	JUN 07	138.17	AUG 06	150.14
DEC 04	138.80	APR 23	126.06				
WATER YEAR 1990	HIGHEST	125.63	MAR 02, 1990			LOWEST	150.14 AUG 06, 1990

413940091344701. Local number, 79-06-07 DAAC1.
 LOCATION.--Lat 41°39'40", long 91°34'47", Hydrologic Unit 07080209, in Iowa City, north of Hawkeye Village (married student housing), University of Iowa, and north of County Road F-46. Owner: University of Iowa.
 AQUIFER.--Silurian: in limestone and dolomite of Silurian age.
 WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 12 in., depth 400 ft, cased to 211 ft, open hole 211-400 ft.
 METHOD.--Monthly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 685 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.81 ft above land-surface datum.
 REMARKS.--Hawkeye Village #1. Water levels affected by wells in the area pumping in late spring, summer, and early fall.
 PERIOD OF RECORD.--June 1987 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 45.51 ft below land-surface datum, June 5, 1987; lowest measured, 132.12 ft below land-surface datum, September 2, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	137.16	JAN 02	68.56	APR 23	58.75	JUL 09	88.52
NOV 16	89.94	FEB 21	61.65	MAY 15	80.37	AUG 06	91.94
DEC 04	75.11	MAR 02	59.46	JUN 07	77.16		
WATER YEAR 1990	HIGHEST	58.75	APR 23, 1990			LOWEST	137.16 OCT 05, 1989

p Near by well being pumped.

413925091324001. Local number, 79-06-09 DDBC1.
 LOCATION.--Lat 41°39'34", long 91°32'42", Hydrologic Unit 07080209, at the Quadrangle Dormitory, University of Iowa, Iowa City. Owner: University of Iowa.
 AQUIFER.--Silurian: in dolomite of Silurian age.
 WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 12 in., depth 430.5 ft, cased to 225 ft, open hole 225-430.5 ft.
 METHOD.--Monthly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 714 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 1.81 ft above land-surface datum.
 REMARKS.--Water levels affected by nearby wells pumping in late spring, summer, and early fall.
 PERIOD OF RECORD.--April 1975 to current year.
 REVISED RECORDS.--WDR IA-84-1.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 74.63 ft below land-surface datum, March 21, 1979; lowest measured, 167.63 ft below land-surface datum, August 2, 1988.
 REVISION.--Highest water level measured, 74.63 ft below land-surface datum, March 21, 1979.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	157.92	JAN 02	112.14	MAY 15	106.64	JUL 09	155.43
NOV 16	148.34	MAR 02	103.17	JUN 07	128.36	AUG 06	156.41
DEC 04	119.64	APR 23	100.04				
WATER YEAR 1990	HIGHEST	100.04	APR 23, 1990			LOWEST	157.92 OCT 05, 1989

JOHNSON COUNTY

413955091320303. Local number, 79-06-10 BDBC3.

LOCATION.--Lat 41°39'58", long 91°32'06", Hydrologic Unit 07080209, at the Currier Hall Dormitory, University of Iowa, Iowa City. Owner: University of Iowa.

AQUIFER.--Silurian-Devonian: in limestone and dolomite of Silurian and Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 12 in., depth 425 ft, cased to 160 ft, open hole 160-425 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 707 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 7.76 ft below land-surface datum.

REMARKS.--Water levels affected by nearby wells pumping in late spring, summer, and early fall. Measurements discontinued May 1990.

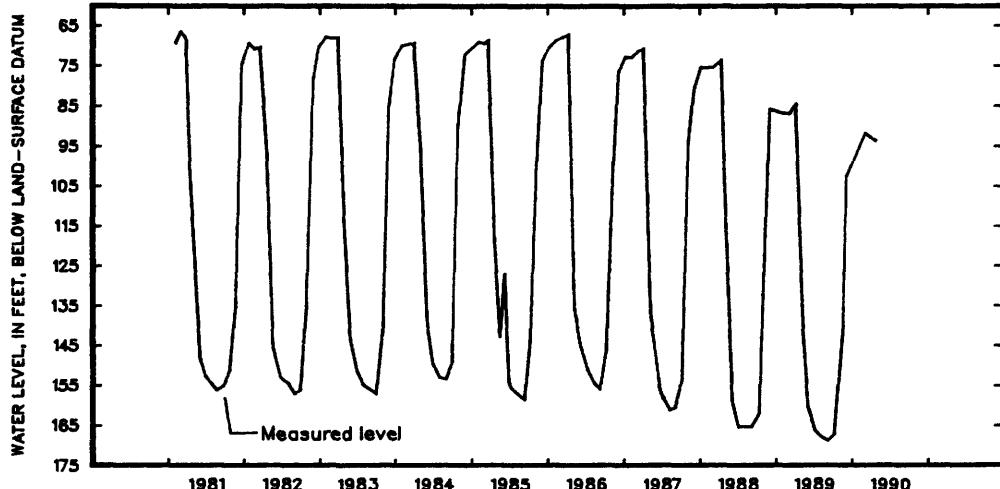
PERIOD OF RECORD.--October 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 62.12 ft below land-surface datum, April 23, 1973; lowest measured, 169.22 ft below land-surface datum, September 5, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	167.21	DEC 04	102.76	MAR 02	92.21	APR 23	94.35
NOV 16	142.65						
WATER YEAR 1990	HIGHEST	92.21	MAR 02, 1990	LOWEST	167.21	OCT 05, 1989	

413955091320303



413840091322801. Local number, 79-06-16 DDAD1.

LOCATION.--Lat 41°38'44", long 91°32'32", Hydrologic Unit 07080209, 1223 South Riverside Drive, Iowa City. Owner: Iowa City Community School District.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 363 ft, cased to 66.5 ft, open hole 66.5-363 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 652 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 2.12 ft above land-surface datum.

REMARKS.--Warehouse well. Water levels affected by wells in the area pumping in late spring, summer, and early fall. Main water, 214-215 ft, in the Silurian. Measurements discontinued August 1990.

PERIOD OF RECORD.--April 1974 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 9.96 ft below land-surface datum, April 11, 1979; lowest measured, 41.50 ft below land-surface datum, July 1, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

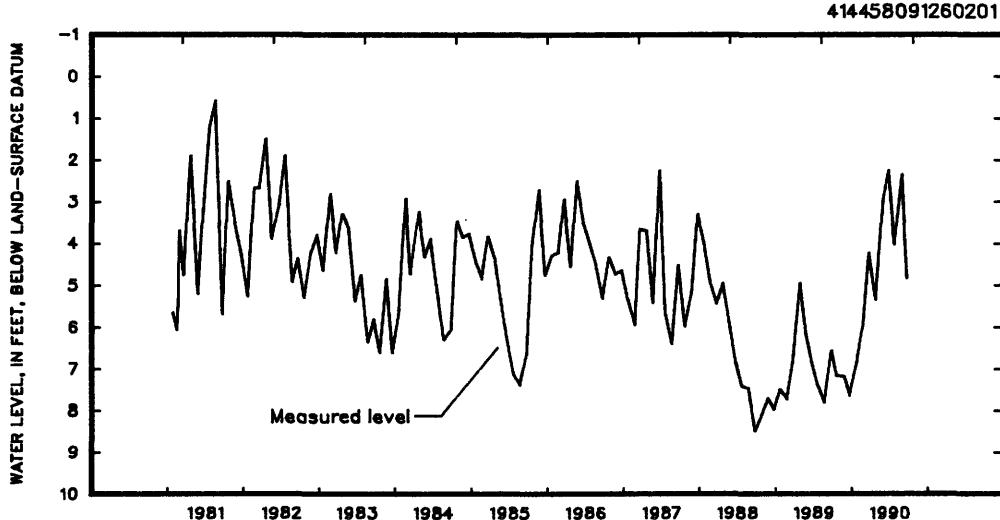
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	32.99	DEC 04	28.82	APR 23	20.74	JUL 09	29.84
NOV 16	33.03	MAR 02	21.68	MAY 15	26.82		
WATER YEAR 1990	HIGHEST	20.74	APR 23, 1990	LOWEST	33.03	NOV 16, 1990	

JOHNSON COUNTY

414458091260201. Local number, 80-05-09 DBBC1.
 LOCATION.--Lat $41^{\circ}44'58''$, long $91^{\circ}26'02''$, Hydrologic Unit 07080209, in the southeast corner of the T junction of County Roads F8W and F36 in the Village of Morse. Owner: Mrs. Frank Miller.
 AQUIFER.--Glacial drift; in material of Pleistocene age.
 WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1.25 in., depth 15 ft, cased to 13 ft, sand point 13-15 ft.
 METHOD.--Monthly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 762 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 2.72 ft above land-surface datum.
 REMARKS.--Records for 1950 to September 1985 are available in the files of the Iowa District Office.
 PERIOD OF RECORD.--August 1950 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.60 ft above land-surface datum, March 14, 1953; lowest measured, 9.22 ft below land-surface datum, September 8, 1955.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	7.20	JAN 23	6.94	APR 24	5.37	JUL 23	4.05
NOV 24	7.23	FEB 23	5.96	MAY 31	2.94	AUG 28	2.38
DEC 20	7.67	MAR 23	4.26	JUN 25	2.28	SEP 21	4.88
WATER YEAR 1990	HIGHEST	2.28	JUN 25, 1990	LOWEST	7.67	DEC 20, 1989	



414315091252001. Local number, 80-05-22 CBCB1.
 LOCATION.--Lat $41^{\circ}43'15''$, long $91^{\circ}25'20''$, Hydrologic Unit 07080209, along the Chicago, Rock Island and Pacific Railroad track, southeast of the overpass on Rapid Creek Road over the track, approximately 5.5 mi northeast of the junction of Interstate 80 and Iowa Highway 1. Owner: Chicago, Rock Island and Pacific Railroad Co.
 AQUIFER.--Glacial drift; in material of Pleistocene age.
 WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 2.25 in., depth 18.43 ft, cased to 18 ft, screened 18-20 ft. Depth originally 20 ft, re-measured June 23, 1989.
 METHOD.--Monthly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 753 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 4.47 ft above land-surface datum.
 REMARKS.--At the site of the former Elmira depot.
 PERIOD OF RECORD.--October 1941 to September 1956, January 1958 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.78 ft below land-surface datum, September 20, 1977; lowest measured, dry, November 10, 15, 20, 25, and 30, 1964, December 5, 10, 15, 20, 25 and 31, 1964, December 1 and 10, 1975, October 21, 1976, November 23, 1976, December 17, 1976, January 20, 1977, and February 18, 1977.
 REVISIONS.--Lowest water level measured, dry, November 10, 15, 20, 25, and 30, 1964, December 5, 10, 15, 20, 25, and 31, 1964, Dec. 1 and 10, 1975, Oct. 21, 1976, Nov. 23, 1976, Dec. 17, 1976, Jan. 20, 1977, and Feb. 18, 1977.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	16.92	JAN 23	17.10	APR 24	15.37	JUL 23	13.31
NOV 24	16.95	FEB 23	17.19	MAY 31	14.29	AUG 28	13.11
DEC 20	16.98	MAR 23	15.72	JUN 15	14.01	SEP 21	12.92
WATER YEAR 1990	HIGHEST	12.92	SEP 21, 1990	LOWEST	17.19	FEB 23, 1990	

JOHNSON COUNTY

414315091252002. Local number, 80-05-22 CBCB2.

LOCATION.--Lat 41°43'15", long 91°25'20", Hydrologic Unit 07080209, along the Chicago, Rock Island and Pacific Railroad track, southeast of the overpass on Rapid Creek Road over the track, approximately 5.5 mi northeast of the junction of Interstate 80 and Iowa Highway 1. Owner: Chicago, Rock Island and Pacific Railroad Co.

AQUIFER.--Devonian: in Cedar Valley limestone of Middle Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 82 ft. Casing information not available.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 753 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 4.01 ft above land-surface datum.

REMARKS.--At the site of the former Elmira depot.

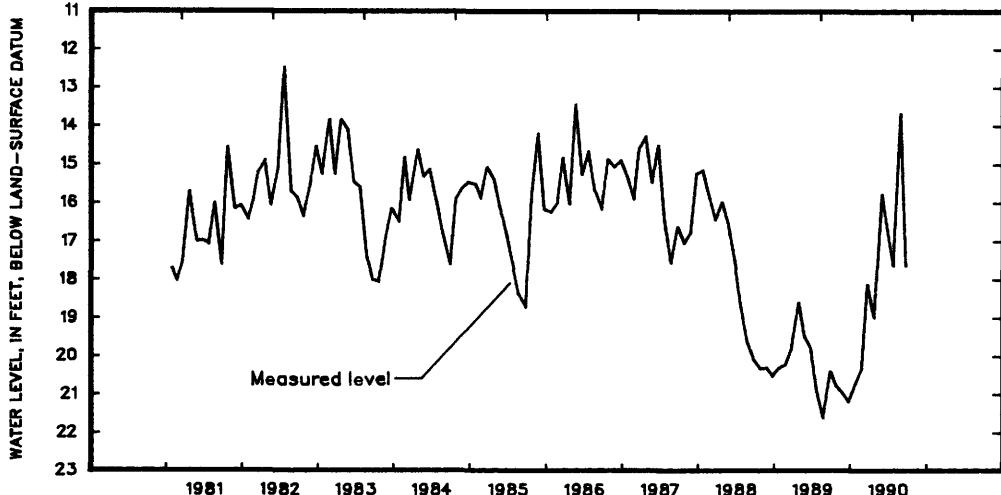
PERIOD OF RECORD.--December 1941 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.15 ft below land-surface datum, April 21, 1952; lowest measured, 21.65 ft below land-surface datum, August 21, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	20.81	JAN 23	20.76	APR 24	19.03	AUG 28	13.71
NOV 24	21.03	FEB 23	20.34	MAY 31	15.81	SEP 21	17.68
DEC 20	21.24	MAR 23	18.16	JUL 23	17.67		
WATER YEAR 1990		HIGHEST	13.71	AUG 28, 1990	LOWEST	21.24	DEC 20, 1989

414315091252002



414149091331501. Local number, 80-06-33 BDDB.

LOCATION.--Lat 41°41'49", long 91°33'15", Hydrologic Unit 07080209, north of Iowa City approximately 0.5 mi east and west of County Road W-66. Owner: River Products Quarry.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled industrial supply well, diameter 18 in., depth 150 ft, cased to 7 ft, open hole 7-150 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 670 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 44.00 ft below land-surface datum.

REMARKS.--Water levels affected by quarrying operations and by wells in the area pumping in late spring summer, and early fall. Measurements discontinued August 1990.

PERIOD OF RECORD.--March 1971 to current year

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured (flowing), 44.00 ft below land-surface datum, December 28, 1979, January 3 and 10, 1980, February 8 and 22, 1980, March 10 and 21, 1980, April 4 and 21, 1980, March 25, 1981, April 15, 1981, December 21, 1981, January 21, 1982, February 19, 1982, March 18, 1982, April 20, 1982, December 27, 1982, January 27, 1983, February 28, 1983, March 28, 1983, April 28, 1983, December 27, 1983, January 30, 1984, March 1 and 29, 1984, April 30, 1984, November 29, 1984, December 27, 1984, January 31, 1985, February 26, 1985, March 19, 1985, April 18, 1985, December 6, 1985, January 6, 1986, February 6, 1986, March 6, 1986, April 6, 1986, and May 7, 1986; lowest measured, 96.74 ft below land-surface datum, November 16, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	93.78	JAN 02	92.52	APR 23	85.29	JUL 09	95.03
NOV 16	96.74	MAR 02	86.43	MAY 15	91.60		
WATER YEAR 1990		HIGHEST	85.29	APR 23, 1990	LOWEST	96.74	NOV 16, 1989

JOHNSON COUNTY

414853091425101. Local number, 81-07-19 BCB11.
LOCATION.--Lat 41° 48' 53", long 91° 42' 51", Hydrologic Unit 07080208, approximately 0.75 mi west and 2.25
mi south of the Town of Swisher. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 535 ft, cased to
130 ft. open hole 130-535 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

METHOD. Monthly measurement with chain and 100 ft staff. Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.50 ft above land-surface datum.

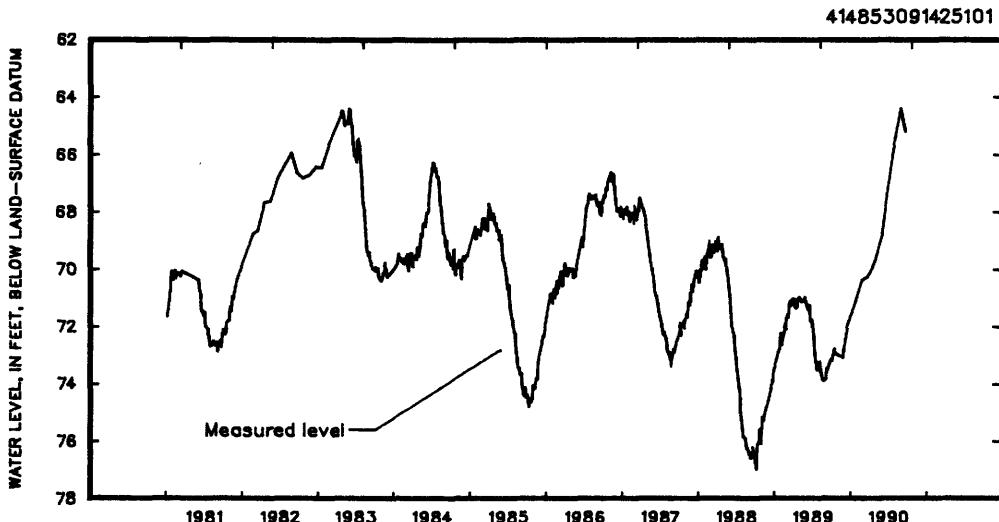
REMARKS.--Plum Creek well. Water-level recorder removed October 1989.

PERIOD OF RECORD.--November 1976 to current year

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 64.46 ft below land-surface datum, May 31, 1983 and August 28, 1990; lowest recorded, 76.97 ft below land-surface datum, October 6, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	73.22	NOV 24	73.14	MAR 23	70.28	JUL 23	65.94
10	72.99	DEC 19	71.95	APR 24	69.83	AUG 28	64.46
15	72.83	JAN 23	71.17	MAY 31	68.86	SEP 21	65.28
20	73.02	FEB 23	70.41				
WATER YEAR 1990		HIGHEST	64.46	AUG 28, 1990	LOWEST	73.22	OCT 05, 1989



415052091483801. Local number, 81-08-05 CCCD1.

LOCATION.—Lat 41°50'52", long 91°48'38", Hydrologic Unit 07080208, approximately 7 mi west of the Town of Swisher, on the north side of County Road F-12. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.—Silurian-Devonian: in dolomite of Silurian and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 533 ft, cased to 135 ft, open hole 133-533 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM. --Elevation of land-surface datum is 818 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.23 ft above land-surface datum.

REMARKS.--First Hole/Swisher.
PERIOD OF RECORD --June 1872

PERIOD OF RECORD.--June 1972, EXTRIMES FOR PERIOD OF RECORD March 1973, November 1975 to current year.
--Highest water level measured 70.73 ft.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 70.73 ft below land-surface datum, March 28, 1973; lowest measured, 98.27 ft below land-surface datum, March 26, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	89.67	MAR 26	98.27	JUL 17	91.75	SEP 17	88.77
WATER YEAR 1990		HIGHEST	88.77	SEP 17, 1990	LOWEST	98.27	MAR 26, 1990

JONES COUNTY

415808091160501. Local number, 83-04-25 CBBB1.

LOCATION.--Lat 41°58'08", long 91°16'05", Hydrologic Unit 07080103, 4 mi north of the Town of Mechanicsville and 1 mi west of County Road X-40. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in. to 41 ft, 5 in. to 517 ft, depth 517 ft, cased to 41 ft, open hole 41 to 517 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 811 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 2.16 ft above land-surface datum.

REMARKS.--White Oak Creek well.

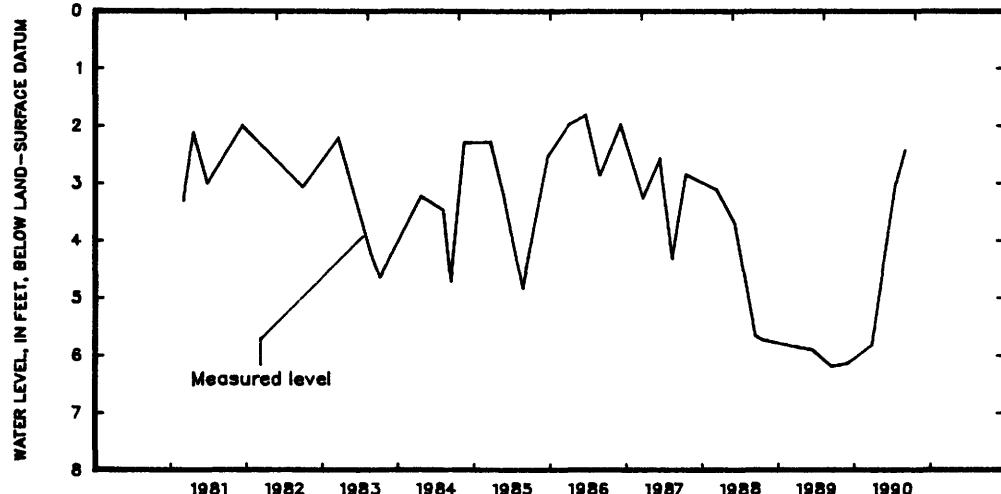
PERIOD OF RECORD.--July 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.24 ft below land-surface datum, April 3, 1979; lowest measured, 6.21 ft below land-surface datum, September 11, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	6.14	MAR 26	5.82	JUL 17	3.03	AUG 30	2.44
WATER YEAR 1990	HIGHEST		2.44	AUG 30, 1990	LOWEST	6.14	DEC 01, 1989

415808091160501



KEOKUK COUNTY

412030092121601. Local number, 76-12-35 DBDC.

LOCATION.--Lat 41°20'30", long 92°12'16", Hydrologic Unit 07080106, approximately 0.25 mi north of the town of Sigourney, 0.25 mi north of Highway 92. Owner: City of Sigourney.

AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 14 in., depth 300 ft, cased to 128 ft, open hole 128-300 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 769 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder base, 1.50 ft above land-surface datum.

REMARKS.--Sigourney South Rock Island No. 1 well. Water levels affected by nearby pumping.

PERIOD OF RECORD.--September 1988 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 84.00 ft below land-surface datum, June 6, 1990; lowest measured, 114.57 ft below land-surface datum, October 4, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1988 TO SEPTEMBER 1990
NOON VALUES

WATER YEAR 1989

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	-----	-----	-----	-----	-----	-----	-----	98.74	96.27	95.04	104.49	87.64
10	-----	-----	-----	-----	-----	-----	-----	90.06	87.64	108.57	91.02	92.25
15	-----	-----	-----	-----	-----	-----	-----	99.57	88.48	95.17	97.55	104.16
20	-----	-----	-----	-----	-----	-----	-----	89.36	90.02	90.35	88.99	87.31
25	-----	-----	-----	-----	-----	-----	-----	88.15	94.04	101.29	99.15	97.79
EOM	-----	-----	-----	-----	-----	-----	-----	98.08	100.41	103.85	88.79	91.01

WATER YEAR 1990

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	94.68	87.05	90.48	96.48	97.36	94.31	88.64	88.20	84.10	85.27	84.35	87.82
10	90.59	88.99	87.68	90.30	91.44	88.94	88.78	84.49	85.33	88.35	90.23	93.30
15	88.09	89.36	87.48	97.45	87.61	84.50	85.57	88.94	95.95	85.08	106.36	89.96
20	99.20	90.98	88.38	92.19	91.29	88.19	95.60	84.88	107.24	92.80	97.26	-----
25	87.57	86.22	87.78	91.47	88.57	94.10	85.47	94.29	84.87	92.89	86.54	89.11
EOM	88.89	91.43	88.60	89.72	88.63	87.97	96.58	84.61	87.25	88.61	97.39	84.71

GROUND-WATER LEVELS

LINN COUNTY

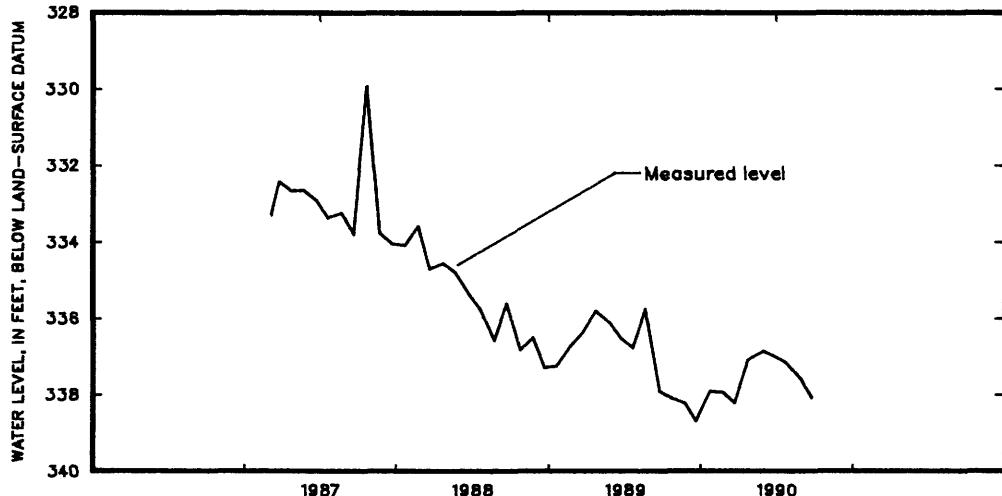
415534091251502. Local number, 82-05-10 CBAA2.
 LOCATION.--Lat $41^{\circ}55'26''$, long $91^{\circ}25'11''$, Hydrologic Unit 07080206, next to the water tower, north of Main Street, 3 blocks west of Iowa Highway 1 in Mt. Vernon. Owner: City of Mt. Vernon.
 AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian age and sandstone and sandy dolomite of Early Ordovician age.
 WELL CHARACTERISTICS.--Drilled unused municipal artesian water well, diameter 12 to 8 in., depth 1,557 ft, cased to 1,054 ft, open hole 1,054-1,557 ft.
 METHOD.--Monthly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 895 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.59 ft above land-surface datum.
 REMARKS.--None.
 PERIOD OF RECORD.--March 1987 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 329.96 ft below land-surface datum, October 22, 1987; lowest measured, 338.73 ft below land-surface datum, December 20, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	338.12	JAN 23	337.93	APR 24	337.11	AUG 28	337.61
NOV 24	338.27	FEB 23	337.98	MAY 31	336.88	SEP 25	338.13
DEC 20	338.73	MAR 23	338.26	JUL 23	337.19		

WATER YEAR 1990 HIGHEST 336.88 MAY 31, 1990 LOWEST 338.73 DEC 20, 1989

415534091251502



41556091313001. Local number, 82-06-10 AABB1.
 LOCATION.--Lat $41^{\circ}55'56''$, long $91^{\circ}16'41''$, Hydrologic Unit 07080206, approximately 1.25 mi south of the Town of Bertram, 1.5 mi east of Iowa Highway 13, and 0.5 mi north of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Silurian: in limestone and dolomite of Silurian age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 471 ft, cased to 126 ft, open hole 126-471 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 755 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.21 ft above land-surface datum.
 REMARKS.--Bertram well.
 PERIOD OF RECORD.--June 1976 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 44.18 ft below land-surface datum, March 16, 1983; lowest measured, 53.29 ft below land-surface datum, December 1, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	53.29	MAR 26	52.39	JUL 17	48.03	SEP 17	47.22

WATER YEAR 1990 HIGHEST 47.22 SEP 17, 1990 LOWEST 53.29 DEC 01, 1989

LINN COUNTY

415442091343101. Local number, 82-06-17 CBAB1.
 LOCATION.--Lat 41°54'42", long 91°34'30", Hydrologic Unit 07080206, approximately 2.5 mi north of the Town of Ely, on the north side of County Road W-8E. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 541 ft, cased to 64 ft, open hole 64-541 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 825 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.55 ft above land-surface datum.

REMARKS.--Ely North well. Records for April 1976 to September 1988 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 69.67 ft below land-surface datum, May 8, 1979; lowest measured, 85.59 ft below land-surface datum, August 9, 1977.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	85.08	MAR 26	83.97	JUL 17	76.95	SEP 17	76.00
WATER YEAR 1990	HIGHEST	76.00	SEP 17, 1990	LOWEST	85.08	DEC 01, 1989	

415422091422601. Local number, 82-07-18 CDCD1.

LOCATION.--Lat 41°54'22", long 91°42'26", Hydrologic Unit 07080205, on 76th Avenue SW, approximately 1.5 mi west of U.S. Highway 218, Cedar Rapids. Owner: Lester Petrak.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Dug unused water-table well, diameter 4 ft, depth 13.5 ft, cribbed with brick.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 835 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Base of recorder shelter, 0.37 ft above land-surface datum.

REMARKS.--Water-level recorder removed October 1987.

PERIOD OF RECORD.--July 1959 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 1.09 ft below land-surface datum, August 4, 1968; lowest recorded, 111.75 ft below land-surface datum, February 8, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	7.69	JAN 23	8.87	APR 24	5.23	AUG 29	4.44
NOV 24	8.44	FEB 23	7.73	MAY 31	4.43	SEP 21	6.12
DEC 19	9.18	MAR 23	4.72	JUL 23	5.43		
WATER YEAR 1990	HIGHEST	4.43	MAY 31, 1990	LOWEST	9.18	DEC 19, 1989	

415343091360101. Local number, 82-07-25 AAAB1.

LOCATION.--Lat 41°53'43", long 91°36'01", Hydrologic Unit 07080208, 0.5 mi northwest of the Town of Ely at the southwest corner of the junction of County Roads E-70 and W-6E. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian: in limestone and dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 401 ft, cased to 121.5 ft, open hole 121.5-401 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 772 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.76 ft above land-surface datum.

REMARKS.--Ely (Northwest) Railroad well. Records for May 1976 to September 1988 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--May 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.08 ft below land-surface datum, December 1, 1986; lowest measured, 19.96 ft below land-surface datum, July 6, 1977.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	17.72	MAR 26	17.20	JUL 17	11.87	SEP 17	10.64
WATER YEAR 1990	HIGHEST	10.64	SEP 17, 1990	LOWEST	17.72	DEC 01, 1989	

GROUND-WATER LEVELS

LINN COUNTY

415509091461801. Local number, 82-08-20 ACBB1.

LOCATION.--Lat 41°55'09", long 91°46'18", Hydrologic Unit 070802005, approximately 1.5 mi southwest of the Town of Fairfax, just northwest of Iowa Highway 149. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age. WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 569 ft, cased to 100.5 ft, open hole 100.5-569 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 842 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 2.39 ft above land-surface datum.

REMARKS.--Rock Pile well.

PERIOD OF RECORD.--March 1973 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 96.70 ft below land-surface datum, June 21, 1974; lowest measured, 109.17 ft below land-surface datum, September 11, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	108.74	MAR 26	109.03	JUL 17	106.05	SEP 17	105.78
			HIGHEST 105.78			LOWEST 109.03	MAR 26, 1990

415834091351601. Local number, 83-06-30 ABBA1.

LOCATION.--Lat 41°58'34", long 91°35'16", Hydrologic Unit 07080206, approximately 200 ft west of 5201 Mount Vernon Road SE, Cedar Rapids. Owner: B.L. Anderson.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 76.5 ft. Casing information not available. Devonian rock reported to yield little, if any, water.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 755 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Hole in pump base, 0.50 ft above land-surface datum.

REMARKS.--Katz well.

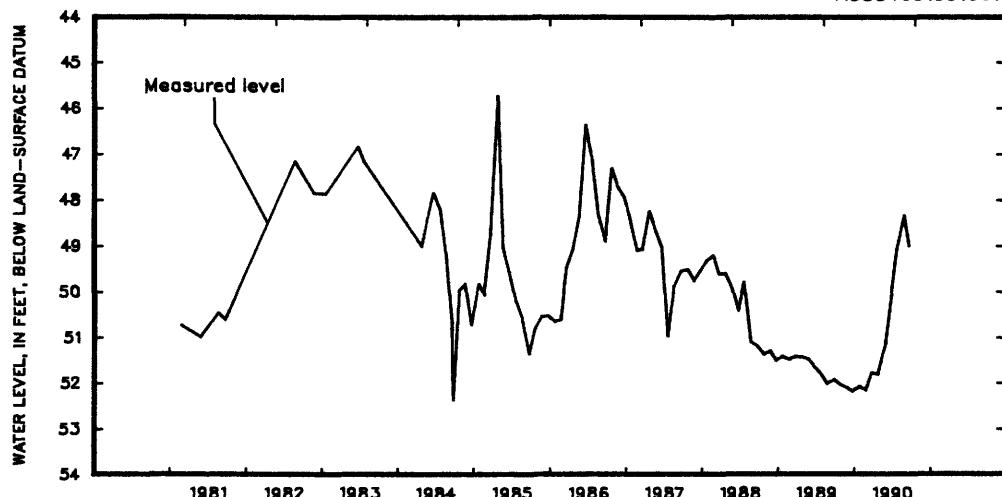
PERIOD OF RECORD.--May 1940 to current year.

EXTREMES OF PERIOD OF RECORD.--Highest water level measured, 41.93 ft below land-surface datum, April 25, 1973; lowest measured, 53.90 ft below land-surface datum, December 21, 1970.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	52.06	JAN 23	52.10	APR 24	51.85	AUG 28	48.37
NOV 24	52.14	FEB 23	52.19	MAY 31	51.18	SEP 21	49.04
DEC 20	52.22	MAR 23	51.80	JUL 23	49.15		
			HIGHEST 48.37			LOWEST 52.22	DEC 20, 1989

415834091351601



LINN COUNTY

415816091393401. Local number, 83-07-28 ADDA1.
 LOCATION.--Lat 41°58'16", long 91°39'34", Hydrologic Unit 07080205, 320 11th Avenue SE, Cedar Rapids.
 Owner: Robert Chadima.
 AQUIFER.--Silurian: in limestone of Silurian age.
 WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 10 in., depth 420 ft, cased to 75
 ft, open hole 75-420 ft.
 METHOD.--Monthly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 735 ft above National Geodetic Vertical Datum of 1929, from
 topographic map. Measuring point: Top of recorder platform, 2.95 ft below land-surface datum.
 REMARKS.--Formerly The Kacena Co., Inc. Water-level recorder removed October 1987.
 PERIOD OF RECORD.--January 1962 to current year.
 REVISED RECORDS.--WDR IA-84-1.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 51.10 ft below land-surface datum, February
 25, 1963; lowest recorded, 101.40 ft below land-surface datum, July 27, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

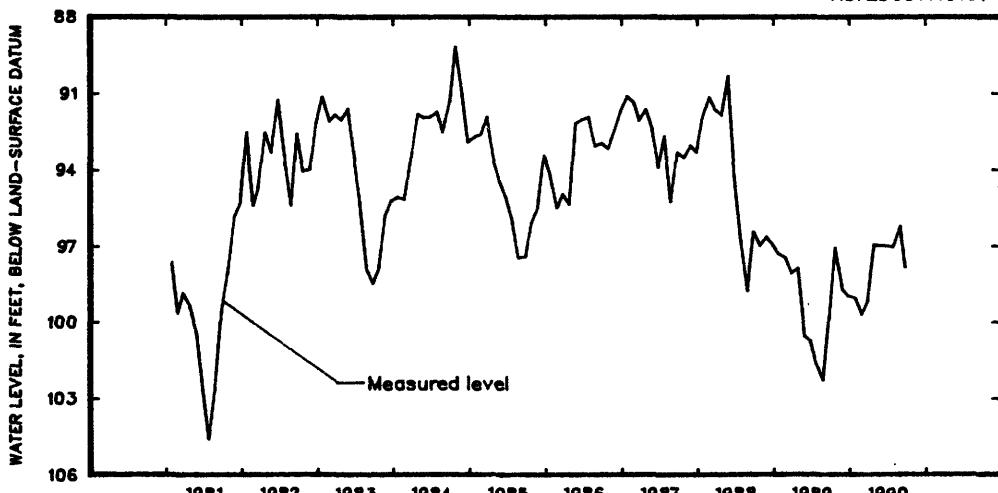
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	91.96	JAN 23	83.64	APR 24	81.37	AUG 28	83.02
NOV 24	88.59	FEB 23	83.04	MAY 31	83.30	SEP 21	82.30
DEC 19	87.60	MAR 23	82.73	JUL 23	83.05		
WATER YEAR 1990		HIGHEST	81.37	APR 24, 1990		LOWEST	91.96 OCT 20, 1989

415725091410101. Local number, 83-07-32 ACDC1.
 LOCATION.--Lat 41°57'25", long 91°41'01", Hydrologic Unit 07080205, northwest corner of 22nd Avenue SW
 and 11th Street SW, Cedar Rapids. Owner: Floyd Fetter.
 AQUIFER.--Silurian: in limestone of Silurian age.
 WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 282 ft. Casing information not available.
 METHOD.--Monthly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 805 ft above National Geodetic Vertical Datum of 1929, from
 topographic map. Measuring point: Plug in well cover at land-surface datum.
 REMARKS.--Water levels may be affected by pumping of near by wells.
 PERIOD OF RECORD.--July 1940 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 75.88 ft below land-surface datum, January
 26, 1942; lowest measured, 107.00 ft below land-surface datum, September 16, 1976.
 REVISION.--Highest water level measured, 75.88 ft below land-surface datum, January 26, 1942.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	97.13	JAN 23	99.13	APR 24	97.00	AUG 28	96.27
NOV 24	98.80	FEB 23	99.77	MAY 31	97.04	SEP 21	97.94
DEC 19	99.04	MAR 23	99.23	JUL 23	97.11		
WATER YEAR 1990		HIGHEST	96.27	AUG 28, 1990		LOWEST	99.77 FEB 23, 1990

415725091410101



LINN COUNTY

420126091484701. Local number, 83-08-06-DDAD1.
 LOCATION.--Lat $42^{\circ}01'26''$, long $91^{\circ}48'48''$, Hydrologic Unit 07080205, approximately 2.5 mi southwest of the Town of Palo, south of County Road E-40 near the former site of the Lincoln Church. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian and limestone and dolomite of Devonian age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 561 ft, cased to 83 ft, open hole 83-561 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 842 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.97 ft above land-surface datum.

REMARKS.--Lincoln Church well. Records for October 1972 to September 1988 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--October 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 61.72 ft below land-surface datum, June 9, 1974; lowest measured, 88.27 ft below land-surface datum, January 31, 1976.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	85.18	MAR 26	84.13	JUL 17	80.53	SEP 17	79.72
			HIGHEST		79.72	SEP 17, 1990	LOWEST 85.18 DEC 01, 1989

420300091325801. Local number, 84-06-33 ABBB1.

LOCATION.--Lat $42^{\circ}03'00''$, long $91^{\circ}32'58''$, Hydrologic Unit 07080206, near the City of Marion on the east side of Iowa Highway 13, approximately 1 mi north of U.S. Highway 151. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 6 in., depth 481 ft, cased to 142 ft, open hole 142-481 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 838 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.90 ft above land-surface datum.

REMARKS.--Marion well.

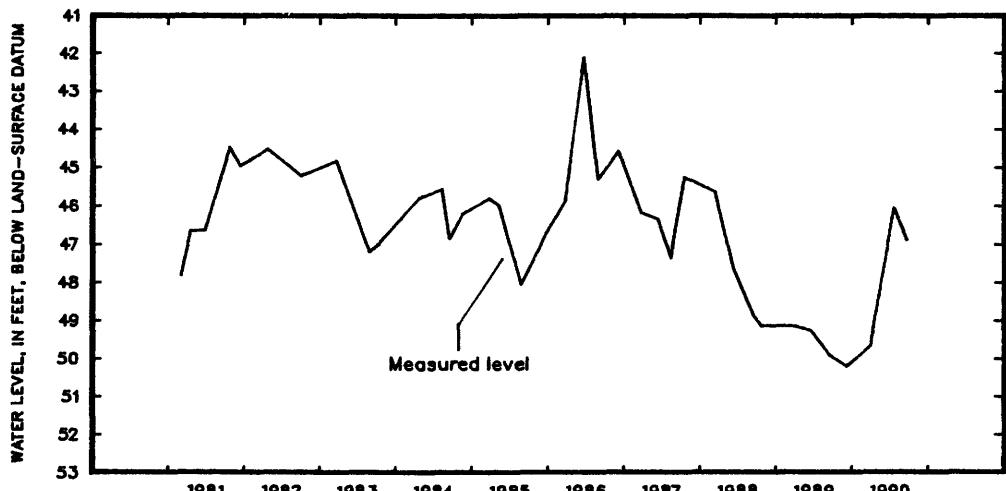
PERIOD OF RECORD.--June 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 42.15 ft below land-surface datum, June 18, 1986; lowest measured, 50.26 ft below land-surface datum, December 1, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	50.26	MAR 26	49.69	JUL 17	46.10	SEP 17	46.95
			HIGHEST 46.10 JUL 17, 1990		LOWEST 50.26	DEC 01, 1989	

420300091325801



LINN COUNTY

420526091370701. Local number, 84-07-13 BCBB1.

LOCATION.--Lat 42°05'26", long 91°37'07", Hydrologic Unit 07080206, approximately 0.25 mi south of the junction of County Roads W-58 and E-34, on the east side of the road, or approximately 3.75 mi north of the City of Marion. Owner: U.S. Geological Survey.

AQUIFER.--Glacial drift; in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 1.25 in., depth 17 ft, cased to 15 ft, screened 15-17 ft.

METHOD.--Twice a month measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 882 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 1.24 ft above land-surface datum.

REMARKS.--USGS13E2 well.

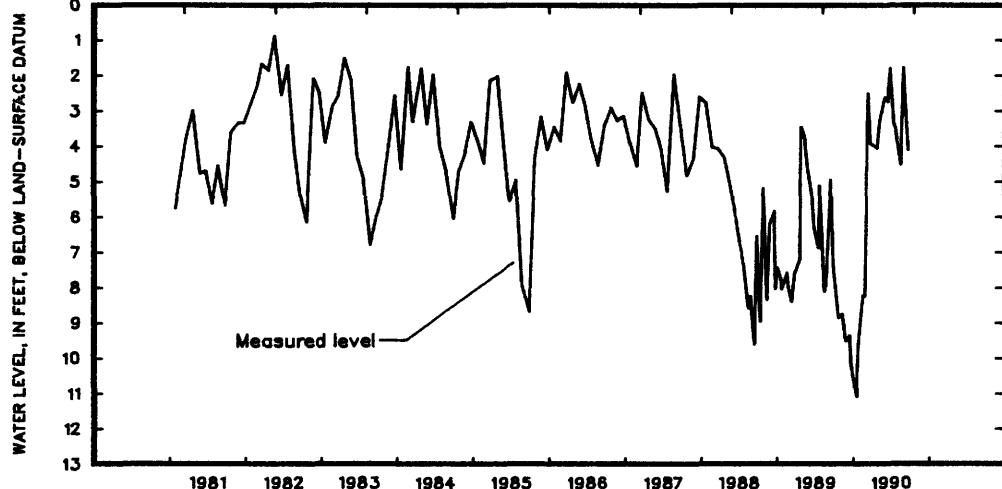
PERIOD OF RECORD.--September 1948 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.93 ft below land-surface datum, May 18, 1982; lowest measured, 15.19 ft below land-surface datum, January 20, 1977.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 20	8.90	JAN 23	9.62	APR 24	4.11	JUL 15	3.42
NOV 07	8.80	FEB 14	8.27	MAY 06	3.34	23	3.59
24	9.56	23	8.26	31	2.66	AUG 16	4.57
DEC 12	9.40	MAR 11	2.55	JUN 14	2.79	28	1.81
20	10.25	23	3.98	25	1.84	SEP 21	4.17
JAN 13	11.13						

WATER YEAR 1990 HIGHEST 1.81 AUG 28, 1990 LOWEST 11.13 JAN 13, 1990



420508091395811. Local number, 84-07-16 DBBB1.

LOCATION.--Lat 42°05'16", long 91°40'02", Hydrologic Unit 07080205, approximately 0.5 mi south of County Road E-34, north of the Town of Robins. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian; in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 520 ft, cased to 173 ft, open hole 173-520 ft, 18 ft of Devonian rock open.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 873 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.20 ft above land-surface datum.

REMARKS.--Robins well. Records for April 1975 to September 1988 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--April 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 36.74 ft below land-surface datum, April 11, 1975; lowest measured, 57.50 ft below land-surface datum, December 1, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	57.50 S	MAR 26	52.45	JUL 17	41.59	SEP 17	43.63

WATER YEAR 1990 HIGHEST 41.59 JUL 17, 1990 LOWEST 57.50 DEC 01, 1989

LINN COUNTY

420340091431601. Local number, 84-08-25 ACAD1.

LOCATION.--Lat 42°03'38", long 91°43'16", Hydrologic Unit 07080205, approximately 1.5 mi northwest of the Town of Hiawatha near the Morrison Cemetery and the KCRG-TV Radio Tower. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian: in dolomite Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 468 ft, cased to 153 ft, open hole 153-468 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 805 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.38 ft above land-surface datum.

REMARKS.--Hiawatha well. Records for October 1973 to September 1988 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--October 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 29.82 ft below land-surface datum, July 7, 1974; lowest measured, 46.51 ft below land-surface datum, December 1, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	46.51	MAR 26	44.15	JUL 17	36.33	SEP 17	37.82
WATER YEAR 1990	HIGHEST	36.33	JUL 17, 1990	LOWEST	46.51	DEC 01, 1989	

420320091472201. Local number, 84-08-28 CBDD1.

LOCATION.--Lat 42°03'20", long 91°47'22", Hydrologic Unit 07080205, 0.5 mi southeast of the Town of Palo, 0.25 mi east of Iowa Highway 94. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 442 ft, cased to 148 ft, open hole 148-442 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 743 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.08 ft above land-surface datum.

REMARKS.--Palo well. Records for April 1976 to September 1988 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--April 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.64 ft below land-surface datum, April 5, 1979; lowest measured, 13.26 ft below land-surface datum, July 17, 1977.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	13.16	MAR 26	10.91	JUL 17	8.37	SEP 17	8.22
WATER YEAR 1990	HIGHEST	8.22	SEP 17, 1990	LOWEST	13.16	DEC 01, 1989	

421149091403301. Local number, 85-07-04 CCCC1.

LOCATION.--Lat 42°11'49", long 91°40'33", Hydrologic Unit 07080205, approximately 5 mi east of the Town of Center Point, north side of County Road E-16. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 435 ft, cased to 41 ft, 5 in. liner 129-147 ft, open hole 41-129 ft and 147-435 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 912 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 1.21 ft above land-surface datum.

REMARKS.--Alice well.

PERIOD OF RECORD.--July 1973 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 17.06 ft below land-surface datum, June 10, 1974; lowest measured, 34.27 ft below land-surface datum, December 1, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	34.27	MAR 26	33.58	JUL 17	27.39	SEP 17	26.63
WATER YEAR 1990	HIGHEST	26.63	SEP 17, 1990	LOWEST	34.27	DEC 01, 1989	

LINN COUNTY

420954091480801. Local number, 85-08-20 ABCD1.

LOCATION.--Lat 42°09'54", long 91°48'08", Hydrologic Unit 07080205, approximately 1.5 mi south of the Town of Center Point near the Lewis Bottoms Access County Park on the south side of County Road W-36.

Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 5 and 4 in., depth 433 ft, cased to 39.5 ft and a liner 147.7-177 ft, open hole 39.5-147.7 ft, and 177-437 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 805 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.84 ft above land-surface datum.

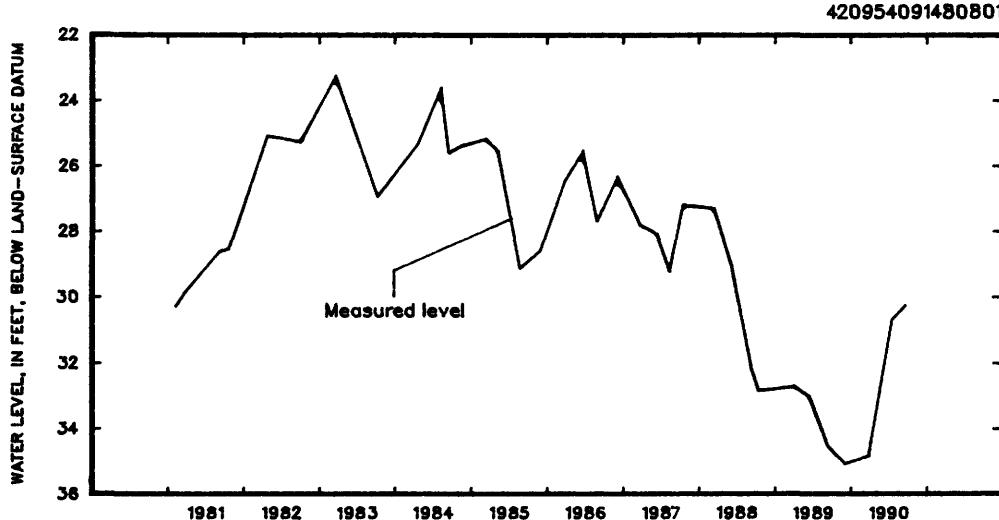
REMARKS.--Center Point Bridge well. Records for March 1974 to September 1988 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--March 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.50 ft below land-surface datum, June 14 and 15, 1974; lowest measured, 35.12 ft below land-surface datum, December 1, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	35.12	MAR 26	34.86	JUL 17	30.70	SEP 17	30.28
WATER YEAR 1990	HIGHEST	30.28	SEP 17, 1990	LOWEST	35.12	DEC 01, 1989	



420730091490401. Local number, 85-08-31 DDCD1.

LOCATION.--Lat 42°07'30", long 91°49'04", Hydrologic Unit 07080205, at the fenced north end of Pleasant Creek Reservoir near the beach house in the beach area. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 481 ft, cased to 214 ft, open hole 214-481 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 833 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.17 ft above land-surface datum.

REMARKS.--Pleasant Creek Reservoir/Silurian well. Records for May 1975 to September 1988 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--May 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 84.17 ft below land-surface datum, April 5, 1976; lowest measured, 108.11 ft below land-surface datum, December 1, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	108.11	MAR 26	107.81	JUL 17	106.96	SEP 17	95.35
WATER YEAR 1990	HIGHEST	95.35	SEP 17, 1990	LOWEST	108.11	DEC 01, 1989	

GROUND-WATER LEVELS

LINN COUNTY

420730091490402. Local number, 85-08-31 DDCD2.

LOCATION.--Lat 42°07'30", long 91°49'04", Hydrologic Unit 07080205, at the fenced north end of Pleasant Creek Reservoir near the beach house in the beach area. Owner: Geological Survey Bureau, DNR, and U.S. Geological Survey.

AQUIFER.--Devonian: in limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 5 in., depth 205 ft, cased to 52 ft, open hole 52 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 841 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.38 ft above land-surface datum.

REMARKS.--Pleasant Creek Reservoir/Devonian well. Records for May 1975 to September 1989 are available

PERIOD OF RECORD.--May 1975 to May 1980, April 1984 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 16.37 ft below land-surface datum, March 7, 1985; lowest measured, 48.55 ft below land-surface datum, November 12, 1976.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 01	18.58	MAR 26	17.25	JUL 17	16.96	SEP 17	17.26
WATER YEAR 1990	HIGHEST		16.96	JUL 17, 1990	LOWEST	18.58	DEC 01, 1989

LYON COUNTY

431812096302701. Local number, 98-48-16 DDAD1.

LOCATION.--Lat 43°18'12", long 96°30'27", Hydrologic Unit 10170203, approximately 3.5 mi east of the City of Canton, S.D., south of U.S. Highway 18. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 358 ft, cased to 358 ft, perforated 335-355 ft. Open to Late Precambrian Sioux quartzite from 335-358 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,268 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.

REMARKS.--Well D-20.

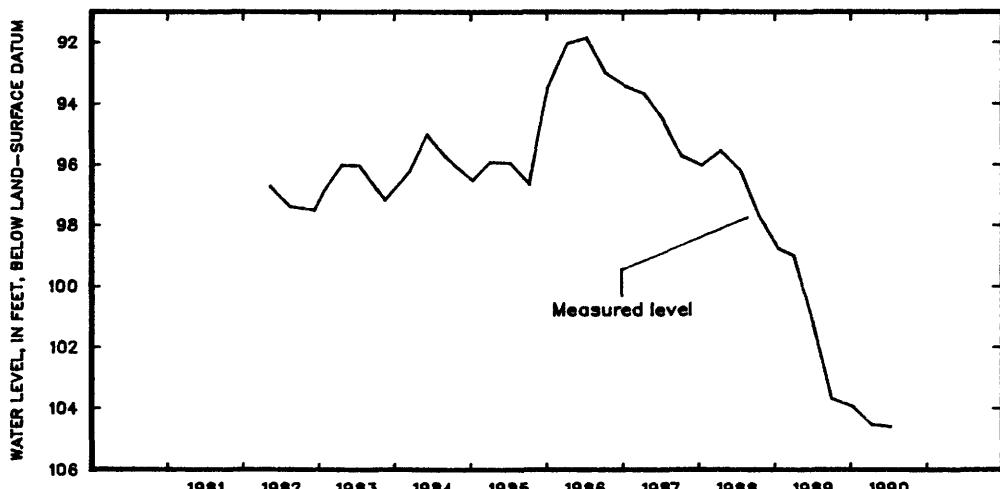
PERIOD OF RECORD.--December 1978 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 91.89 ft below land-surface datum, July 8, 1986; lowest measured, 104.65 ft below land-surface datum, July 12, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	103.74	JAN 09	103.99	APR 11	104.58	JUL 12	104.65
WATER YEAR 1990	HIGHEST	103.74	OCT 03, 1989	LOWEST	104.65	JUL 12, 1990	

431812096302701



LYON COUNTY

432140095595301. Local number, 99-44-26 DDDDI.

LOCATION.--Lat $43^{\circ}21'40''$, long $95^{\circ}59'53''$, Hydrologic Unit 10170204, 1 mi north of the City of George, west of Iowa Highway 339. Owner: State of Iowa.

AQUIFER.--Glacial drift; in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 20 in., depth 38 ft, lined with tile.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,400 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in well cover, 2.01 ft above land-surface datum.

REMARKS.--None.

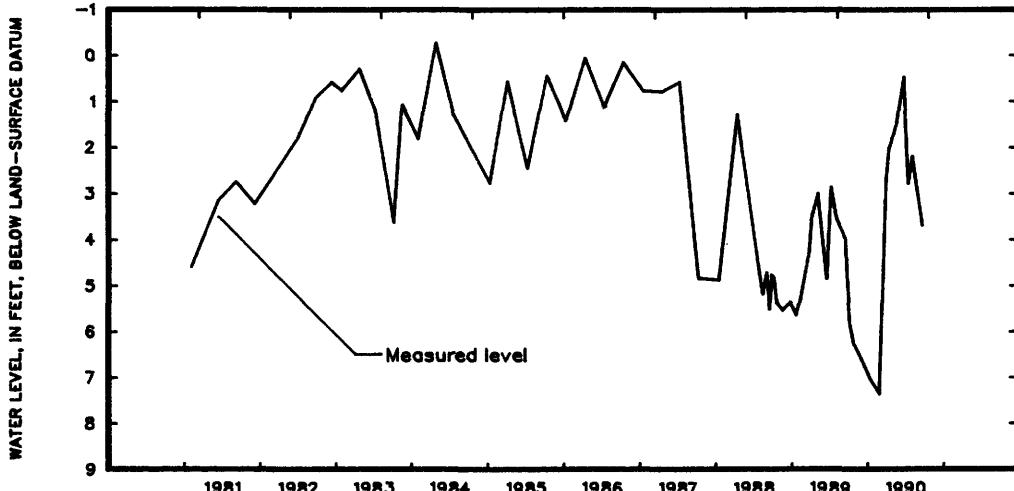
PERIOD OF RECORD.--October 1940 to June 1943, May 1947 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.41 ft above land-surface datum, May 9, 1979; lowest measured, 9.74 ft below land-surface datum, October 24, 1940.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	5.85	JAN 10	7.09	APR 11	2.04	JUL 12	2.82
25	6.33	FEB 22	7.40	MAY 18	1.48	AUG 01	2.23
NOV 28	6.64	MAR 28	2.74	JUN 20	.51	SEP 18	3.75
WATER YEAR 1990		HIGHEST .51 JUN 20, 1990				LOWEST 7.40 FEB 22, 1990	

432140095595301



432553096105701. Local number, 99-45-05 ABAC1.

LOCATION.--Lat $43^{\circ}25'53''$, long $96^{\circ}10'55''$, Hydrologic Unit 10170204, 0.05 mi south of Iowa Highway 9 on 2nd Street, Rock Rapids. Owner: City of Rock Rapids.

AQUIFER.--Dakota; in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 10 in., depth 375 ft, cased to 296 ft, open hole 296-375 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,368 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in cover over casing, 1.00 ft above land-surface datum.

REMARKS.--City test well No. 3.

PERIOD OF RECORD.--August 1960 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 100.08 ft below land-surface datum, July 27, 1964; lowest measured, 115.10 ft below land-surface datum, September 18, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	114.70	FEB 22	114.82	MAY 17	114.91	AUG 01	114.95
NOV 28	114.94	MAR 27	114.86	JUN 20	114.84	SEP 18	115.10
JAN 10	114.68						
WATER YEAR 1990		HIGHEST 114.68 JAN 10, 1990				LOWEST 115.10 SEP 18, 1990	

GROUND-WATER LEVELS

LYON COUNTY

432601096335511. Local number, 100-48-31 CCCC11.
 LOCATION.--Lat 43°26'01", long 96°33'55" Hydrologic Unit 10170203, 0.5 mi west and 2.5 mi south of the Village of Granite. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Dakota: in sandstone of Cretaceous age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 657 ft, cased to 657 ft, perforated 450-455 ft and 630-650 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,417 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing at land-surface datum.
 REMARKS.--Well D-19.
 PERIOD OF RECORD.--December 1978 to December 1980, May 1982 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 152.17 ft below land-surface datum, October 9, 1986; lowest measured, 158.25 ft below land-surface datum, April 11, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	157.44	JAN 10	157.06	APR 11	158.25	JUL 12	157.52
WATER YEAR 1990	HIGHEST 157.06	JAN 10, 1990	LOWEST 158.25	APR 11, 1990			

MADISON COUNTY

411727093483001. Local number, 75-26-23 AAAC1.
 LOCATION.--Lat 41°17'27", long 93°48'30" Hydrologic Unit 07100008, near the shelter house in the city park, St. Charles. Owner: City of St. Charles.
 AQUIFER.--Mississippian: in limestone of Mississippian age.
 WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 867 ft, cased to 657 ft, open hole 657-867 ft.
 METHOD.--Intermittent measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,067 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in well cover, 1.20 ft above land-surface datum.
 REMARKS.--City well No. 1.
 PERIOD OF RECORD.--November 1962 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 261.62 ft below land-surface datum, November 20, 1962; lowest measured, 275.80 ft below land-surface datum, March 31, 1987.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
NOV 15	274.89	JUN 20	274.87	AUG 08	275.19	SEP 25	275.05
MAR 13	274.97						

WATER YEAR 1990 HIGHEST 274.87 JUN 20, 1990 LOWEST 275.19 AUG 08, 1990

MAHASKA COUNTY

411912092273601. Local number, 75-14-10 BAAC.
 LOCATION.--Lat 41°19'12", long 92°27'30" Hydrologic Unit 07080106, approximately 0.5 mi south of Iowa Highway 92 in the town of Rose Hill. Owner: City of Rose Hill.
 AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.
 WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 6 in., depth 370 ft, casing interval unknown.
 INSTRUMENTATION.--Analog digital recorder.
 DATUM.--Elevation of land-surface datum is 815 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder platform, 1.63 ft above land-surface datum.
 REMARKS.--Rose Hill No. 2 well.
 PERIOD OF RECORD.--May 1989 to present.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 102.72 ft below land-surface datum, May 24, 1989; lowest measured, 103.61 ft below land-surface datum, March 5, 6, 7, and 8, 1990.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1988 TO SEPTEMBER 1990

NOON VALUES

WATER YEAR 1989

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	-----	-----	-----	-----	-----	-----	-----	-----	-----	103.37	103.17	103.46
10	-----	-----	-----	-----	-----	-----	-----	-----	-----	103.17	103.49	103.45
15	-----	-----	-----	-----	-----	-----	-----	-----	-----	103.40	103.31	103.48
20	-----	-----	-----	-----	-----	-----	-----	-----	-----	103.27	103.22	103.47
25	-----	-----	-----	-----	-----	-----	-----	-----	103.22	103.51	103.38	103.46
EOM	-----	-----	-----	-----	-----	-----	-----	-----	103.38	103.42	103.19	103.47

WATER YEAR 1990

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	103.17	102.86	103.03	103.54	103.50	103.60	103.43	103.41	103.00	103.29	103.29	103.21
10	103.32	103.32	103.40	103.41	103.29	103.50	103.36	103.22	103.48	103.24	103.17	103.09
15	103.17	103.24	103.58	103.51	103.32	-----	103.44	103.16	103.25	103.05	103.18	103.01
20	103.40	103.32	103.58	103.27	103.60	-----	103.46	103.16	103.06	103.17	103.05	103.16
25	103.57	103.15	103.31	103.24	-----	-----	103.32	103.06	103.23	103.21	103.06	102.77
EOM	103.41	103.58	103.25	103.50	-----	-----	103.45	103.39	103.19	103.28	103.06	103.29

MAHASKA COUNTY

411914092273001. Local number, 75-14-10 BABC.

LOCATION.--Lat 41°19'14", long 92°27'47", Hydrologic Unit 07080106, approximately 0.45 mi south of Iowa Highway 92, behind City Hall in the Town of Rose Hill. Owner: City of Rose Hill.

AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 5 in., depth 273 ft, casing interval unknown.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 817 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.53 ft above land-surface datum.

REMARKS.--Rose Hill No. 4 well.

PERIOD OF RECORD.--September 1988 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 102.30 ft below land-surface datum, May 24 1989; lowest measured, 103.20 ft below land-surface datum, October 26, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1987 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP 01, 1988	102.52	MAY 24, 1989	102.30	OCT 26, 1989	103.20	APR 09, 1990	103.06
OCT 13	102.70	JUN 21	102.74	JAN 03, 1990	103.00	JUL 19,	102.76
MAY 11, 1989	103.14	JUL 20	102.89				

WATER YEAR 1990 HIGHEST 102.76 JUL 19, 1990 LOWEST 103.20 OCT 26, 1989

412002092470301. Local number, 75-17-02 BAAB.

LOCATION.--Lat 41°20'02", long 92°47'03", Hydrologic Unit 07100009, just south of County Road G-39, in a field at the south end of Main Street in the Town of Leighton. Owner: Royce Pierson.

AQUIFER.--Pennsylvanian: in sandstone of Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused private semi-confined well, diameter 12 in., depth 50 ft, cased to 30.25 ft, open 30.25 to 50 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 780 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.38 ft above land-surface datum.

REMARKS.--Formerly Leighton No. 2 well.

PERIOD OF RECORD.--October 1988 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.50 ft below land-surface datum, July 19, 1990; lowest measured, 15.41 ft below land-surface datum, January 3, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEARS OCTOBER 1988 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13, 1988	13.92	JUL 20	14.24	OCT 26	15.19	APR 09	11.74
MAY 11, 1989	12.67	AUG 24	15.22	JAN 03, 1990	15.41	JUL 19	8.50

WATER YEAR 1990 HIGHEST 8.50 JUL 19, 1990 LOWEST 15.41 JAN 03, 1990

412023092471201. Local number, 76-17-35 CADB.

LOCATION.--Lat 41°20'23", long 92°47'12", Hydrologic Unit 07100009, inside the old treatment plant at the north end of the town of Leighton. Owner: Town of Leighton.

AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 6 in., depth 210 ft, cased 0-210 ft, perforated 140-210 ft. Open to Pleistocene sand and gravel 140-142 ft.

INSTRUMENTATION.--Analog Digital Recorder.

DATUM.--Elevation of land-surface datum is 823 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder platform, 2.06 ft above land-surface datum.

REMARKS.--Leighton No. 1 well.

PERIOD OF RECORD.--May 1989 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 80.50 ft below land-surface datum, August 30 and 31, 1990; lowest measured, 84.15 ft below land-surface datum, September 6 and 7, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEARS OCTOBER 1988 TO SEPTEMBER 1990
NOON VALUES

WATER YEAR 1989

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	83.78	84.14
10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	83.95	83.95
15	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	84.01	83.94
20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	84.06	83.89
25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	83.58	84.06
EOM	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	83.68	84.04

WATER YEAR 1990

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	83.95	-----	-----	82.84	82.56	82.56	81.99	81.33	80.96	80.86	80.56	80.53
10	83.91	-----	-----	82.77	82.52	82.43	81.88	81.25	81.01	80.90	80.57	80.55
15	83.82	-----	-----	82.77	82.46	82.21	81.74	81.13	81.03	80.74	80.57	80.55
20	83.76	-----	-----	82.70	82.54	82.30	81.66	81.08	80.88	80.73	80.56	80.56
25	83.70	-----	-----	82.61	82.61	82.27	81.61	80.99	80.81	80.66	80.53	80.58
EOM	-----	-----	-----	82.60	82.62	82.08	81.47	81.01	80.84	80.56	80.50	80.62

GROUND-WATER LEVELS

MAHASKA COUNTY

412020092471002. Local number, 76-17-35 CADB.
 LOCATION.--Lat $41^{\circ}20'20''$, long $93^{\circ}47'10''$, Hydrologic Unit 07100009, 150 ft east of the old treatment plant near a retirement village on the north end of the Town of Leighton. Owner: Town of Leighton.
 AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian and sandstone and sandy dolomite of Early Ordovician age.
 WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 8 in., depth 2200 ft, cased to 1778 ft, open 1778-2200 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 820 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 5.43 ft above land-surface datum.
 REMARKS.--Leighton No. 4 well.
 PERIOD OF RECORD.--May 1989 to present.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 215.38 ft below land-surface datum, May 11, 1989; lowest measured, 221.89 ft below land-surface datum, July 19, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEARS OCTOBER 1988 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 11, 1989	215.38	OCT 26	218.20	APR 09	220.42	JUL 19	221.89
JUL 20	216.58	JAN 03, 1990	219.43	JUL 19	221.89		
WATER YEAR 1990	HIGHEST	218.20	OCT 26, 1989	LOWEST	221.89	JUL 19, 1990	

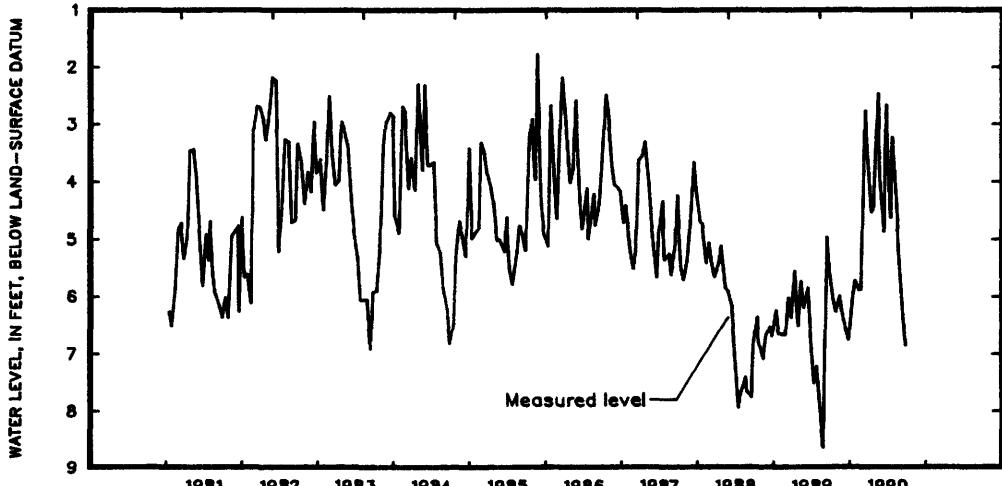
MARION COUNTY

411323093142601. Local number, 74-21-11 DBCC1.
 LOCATION.--Lat $41^{\circ}13'23''$, long $93^{\circ}14'26''$, Hydrologic Unit 07100008, north of the water tower in the town square, Melcher. Owner: Town of Melcher.
 AQUIFER.--Glacial drift: in material of Pleistocene age.
 WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 18 in., depth 12.2 ft, lined with tile. Depth originally 25 ft, re-measured in 1981.
 METHOD.--Twice a month measurement with chalked tape by observer.
 DATUM.--Elevation of land-surface datum is 948 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of tile casing at land-surface datum.
 REMARKS.--Town well No. 2.
 PERIOD OF RECORD.--March 1950 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.20 ft below land-surface datum, October 10, 1973; lowest measured, 15.27 ft below land-surface datum, October 22, 1953.
 REVISION.--Highest water level measured, 0.20 ft below land-surface datum, October 10, 1973; lowest measured, 15.27 ft below land-surface datum, October 22, 1953.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	6.10	JAN 08	6.15	APR 10	4.56	JUL 11	4.66
23	6.30	22	5.76	20	4.45	21	3.27
NOV 10	6.03	FEB 10	5.93	MAY 14	2.50	AUG 11	4.44
21	6.29	21	5.90	22	3.98	20	5.27
DEC 11	6.64	MAR 12	2.80	JUN 11	4.90	SEP 11	6.45
23	6.79	26	3.67	20	2.70	24	6.90
WATER YEAR 1990	HIGHEST	2.50	MAY 14, 1990	LOWEST	6.90	SEP 24, 1990	

411323093142601



GROUND-WATER LEVELS

329

MARION COUNTY

411329093142902. Local number, 74-21-11 DBBB2.

LOCATION.--Lat 41°13'23", long 93°14'29", Hydrologic Unit 07100008, southeast corner of the T junction of North B Street and Main Street, Melcher. Owner: Town of Melcher.

AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 119 ft, cased to 76 ft, open hole 76-119 ft. Sand and gravel 103-117 ft. Pennsylvanian shale 117-119 ft.

METHOD.--Twice a month measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 943 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 1.82 ft above land-surface datum.

REMARKS.--Town well No. 3, well 11K1.

PERIOD OF RECORD.--July 1945 to December 1955, October 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.43 ft below land-surface datum, May 21, 1986; lowest measured (nearby well pumping), 108.85 ft below land-surface datum, December 4, 6-7, 1949.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	21.44	JAN 08	21.96	APR 10	20.14	JUL 11	20.04
23	21.78	22	21.06	20	19.98	21	20.03
NOV 10	21.48	FEB 10	21.24	MAY 14	19.68	AUG 11	20.27
21	21.70	21	21.15	22	19.83	20	20.46
DEC 11	21.96	MAR 12	19.92	JUN 11	19.98	SEP 11	21.32
23	22.08	26	20.05	20	19.73	24	21.58

WATER YEAR 1990 HIGHEST 19.68 MAY 14, 1990 LOWEST 22.08 DEC 23, 1989

411328093143503. Local number, 74-21-11 CAAD3.

LOCATION.--Lat 41°13'28", long 93°14'35", Hydrologic Unit 07100008, northeast corner of the junction of West 1st Street and North A Street, Melcher. Owner: Town of Melcher.

AQUIFER.--Glacial drift: in sand of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 1.25 in., depth 96.5 ft, cased to 80 ft, screened 80-82 ft, open hole 82-96.5 ft.

METHOD.--Twice a month measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 944 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 0.51 ft above land-surface datum.

REMARKS.--Town well No. 5, well 11L1.

PERIOD OF RECORD.--January 1956 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 9.76 ft below land-surface datum, August 20, 1990; lowest measured (nearby well pumping), 55.22 ft below land-surface datum, January 26, 1956.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	12.77	JAN 08	13.23	APR 10	12.43	JUL 11	11.48
23	12.96	22	13.09	20	11.82	21	11.44
NOV 10	12.85	FEB 10	12.89	MAY 14	11.32	AUG 11	11.55
21	12.96	21	12.94	22	11.34	20	9.76
DEC 11	13.15	MAR 12	12.49	JUN 11	11.44	SEP 11	12.24
23	13.19	26	12.05	20	11.29	24	12.58

WATER YEAR 1990 HIGHEST 9.76 AUG 20, 1990 LOWEST 13.23 JAN 08, 1990

MARSHALL COUNTY

415640093062101. Local number, 82-19-06 ACCB.

LOCATION.--Lat 41°56'40", long 93°06'21", Hydrologic Unit 07080106, located on the west side of Iowa Highway 395, approximately 0.4 mi south of the junction of Iowa Highway 395 and 330, in the old treatment plant in the City of Melbourne. Owner: City of Melbourne.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 10 in., depth 1,340 ft, cased to 1,212 ft, open hole 1,212-1,340 ft. Open to Ordovician rock 1,305-1,340 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,045 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.65 ft above land-surface datum.

REMARKS.--Melbourne No. 1 well.

PERIOD OF RECORD.--September 1988 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 227.62 ft below land-surface datum, September 7, 1988; lowest measured, 228.72 ft below land-surface datum, July 25, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEARS OCTOBER 1987 TO SEPTEMBER 1990

DATE	WATER LEVEL						
SEP 07, 1988	227.62	SEP 06, 1989	228.32	NOV 29, 1989	228.58	MAY 02, 1990	228.64
JUN 20, 1989	227.82	OCT 10	228.39	JAN 19, 1990	228.67	JUL 23	228.72

WATER YEAR 1990 HIGHEST 228.39 OCT 10, 1989 LOWEST 228.72 JUL 23, 1990

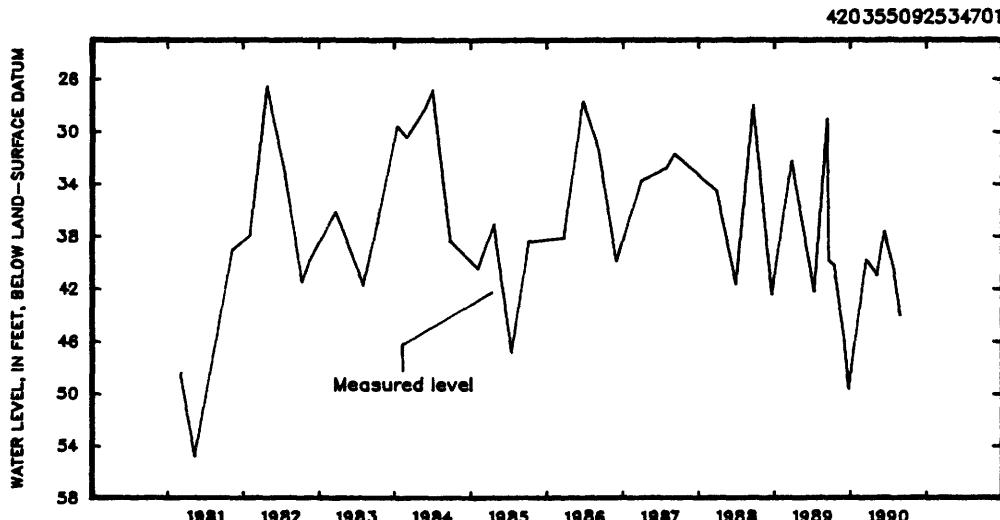
GROUND-WATER LEVELS

MARSHALL COUNTY

420355092534701. Local number, 84-18-24 CDCA1.
 LOCATION.--Lat 42°03'55", long 92°53'47", Hydrologic Unit 07080208, east of Riverview Park and south of the sewage treatment plant, Marshalltown. Owner: City of Marshalltown.
 AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.
 WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 200 ft, cased to 190 ft, screened 190-200 ft.
 METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 871 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing at land-surface datum.
 REMARKS.--None.
 PERIOD OF RECORD.--May 1949 to August 1971, March 1973 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.92 ft below land-surface datum, July 13, 1951; lowest measured, 54.95 ft below land-surface datum, May 8, 1981.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	40.38	DEC 19	49.75	MAY 02	41.12	JUL 23	40.69
NOV 29	46.16	MAR 12	39.94	JUN 07	37.76	AUG 23	44.18
		HIGHEST	37.76	JUN 07, 1990		LOWEST	49.75 DEC 19, 1989



421120093003001. Local number, 85-19-12 ADCD.
 LOCATION.--Lat 42°11'20", long 93°00'30", Hydrologic Unit 07080207, located behind the old City Hall across the street from the Community Center and Fire Station. Owner: City of Liscomb.
 AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.
 WELL CHARACTERISTICS.--Drilled unused public-supply artesian well, diameter 8 in., depth 278 ft, cased to 159 ft, perforated 110-159 ft, open hole 159-278 ft. Open to Devonian rock 274-278 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,008 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.56 ft above land-surface datum.
 REMARKS.--Liscomb No. 1 well.
 PERIOD OF RECORD.--September 1988 to present.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 97.61 ft below land-surface datum, July 23, 1990; lowest measured, 101.50 ft below land-surface datum, November 29, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEARS OCTOBER 1987 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP 06, 1988	100.52	SEP 06, 1989	101.27	NOV 29, 1989	101.50	MAY 02, 1990	100.59
JUN 20, 1989	101.19	OCT 10	101.44	JAN 19, 1990	101.47	JUL 23	97.61
		HIGHEST	97.61	JUL 23, 1990		LOWEST	101.50 NOV 29, 1989

MONONA COUNTY

415456095414101. Local number, 82-42-14 ADCAI.

LOCATION.--Lat $41^{\circ}54'56''$, long $95^{\circ}41'41''$, Hydrologic Unit 10230007, approximately 6 mi southeast of the Town of Soldier, on the north side of Iowa Highway 37. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 341 ft, cased to 336 ft, slotted 311-336 ft, gravel-packed.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,340 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.02 ft above land-surface datum.

REMARKS.--Well WC-4.

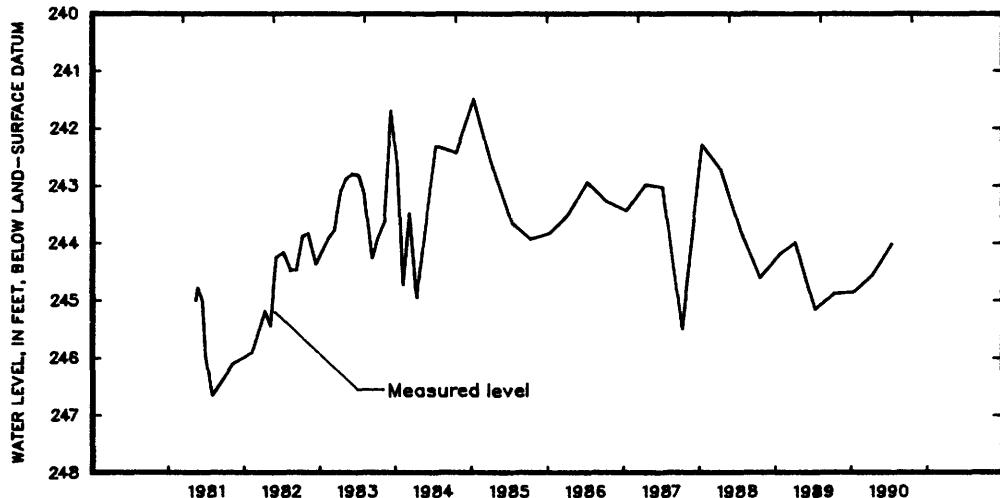
PERIOD OF RECORD.--May 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 240.25 ft below land-surface datum, January 10, 1984; lowest measured, 246.69 ft below land-surface datum, July 28, 1981.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	244.91	JAN 11	244.88	APR 10	244.58	JUL 11	244.04
WATER YEAR 1990	HIGHEST	244.04	JUL 11, 1990	LOWEST	244.91	OCT 05, 1989	

415456095414101



420004095451501. Local number, 83-42-17 ACDD1.

LOCATION.--Lat $42^{\circ}00'04''$, long $95^{\circ}45'15''$, Hydrologic Unit 10230001, approximately 1.75 mi northeast of the Town of Soldier, 0.25 mi west of Iowa Highway 183. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 161 ft, cased to 161 ft, slotted 149-154 ft. Open to 8 ft of Pennsylvanian shale and limestone, 153-161 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,160 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.

REMARKS.--Well WC-178.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 55.17 ft below land-surface datum, January 7, 1985; lowest measured, 64.09 ft below land-surface datum, September 7, 1983.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	63.44	JAN 11	61.71	APR 10	63.80	JUL 11	60.46
WATER YEAR 1990	HIGHEST	60.46	JUL 11, 1990	LOWEST	63.80	APR 10, 1990	

GROUND-WATER LEVELS

MONONA COUNTY

420139095155701. Local number, 83-43-04 CBCB1.
 LOCATION.--Lat $42^{\circ}01'39''$, long $95^{\circ}15'57''$, Hydrologic Unit 10230005, approximately 5.5 mi northwest of the Town of Soldier and 1.5 mi north of Iowa Highway 37. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 321 ft, cased to 315 ft, slotted 297-315 ft, gravel-packed, open hole 315-321 ft.
 METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,235 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.53 ft above land-surface datum.
 REMARKS.--Well WC-5.
 PERIOD OF RECORD.--May 1981 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 184.67 ft below land-surface datum, October 15, 1984; lowest measured, 189.96 ft below land-surface datum, February 2, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	187.29	JAN 11	187.43	APR 10	185.47	JUL 11	186.98
			HIGHEST 185.47	APR 10, 1990		LOWEST 187.43	JAN 11, 1990

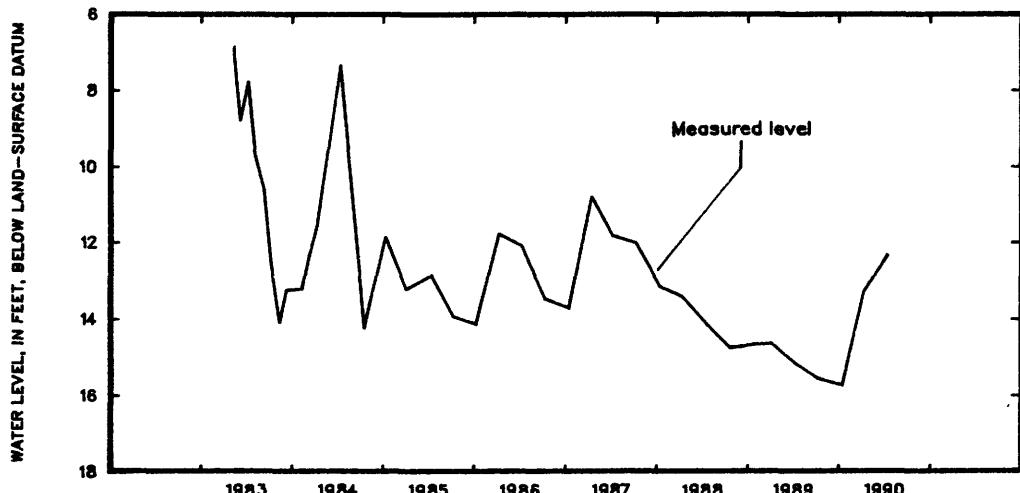
420730095510701. Local number, 84-43-04 ABAAl.
 LOCATION.--Lat $42^{\circ}07'30''$, long $95^{\circ}51'07''$, Hydrologic Unit 10230005, approximately 4 mi southwest of the Town of Mapleton, on the north side of Iowa Highway 175. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Maple alluvial: in sand and gravel of Holocene age.
 WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 72 ft, cased to 58 ft, slotted 53-58 ft, gravel-packed, open hole 58-72 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.40 ft above land-surface datum.
 REMARKS.--Well WC-163.
 PERIOD OF RECORD.--May 1983 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.90 ft below land-surface datum, May 5, 1983; lowest measured, 15.79 ft below land-surface datum, January 11, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	15.61	JAN 11	15.79	APR 10	13.30	JUL 11	12.36
			HIGHEST 12.36	JUL 11, 1990		LOWEST 15.79	JAN 11, 1990

420730095510701



MONONA COUNTY

420406095543301. Local number, 84-44-24 DCAD1.

LOCATION.--Lat 42°04'06", long 95°54'33", Hydrologic Unit 10230005, on the south side of the Town of Castana, 0.25 mi east of Iowa Highway 175. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Maple terrace: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 74 ft, cased to 71 ft, slotted 66.5-71 ft, gravel-packed, open hole 71-74 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,105 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.

REMARKS.--Well WC-166.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.79 ft below land-surface datum, April 13, 1987; lowest measured, 22.54 ft below land-surface datum, October 7, 1985.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	21.13	JAN 11	21.09	APR 10	18.90	JUL 11	20.19
WATER YEAR 1990	HIGHEST		18.90	APR 10, 1990		LOWEST	21.13 OCT 05, 1989

421018095582001. Local number, 85-44-16 CDAA1.

LOCATION.--Lat 42°10'18", long 95°58'20", Hydrologic Unit 10230003, approximately 1.25 mi west of the Town of Ticonic on the north side of County Road E-16. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 81 ft, cased to 77 ft, slotted 67-77 ft, gravel-packed, open hole 77-81 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,060 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.25 ft above land-surface datum.

REMARKS.--Well WC-155.

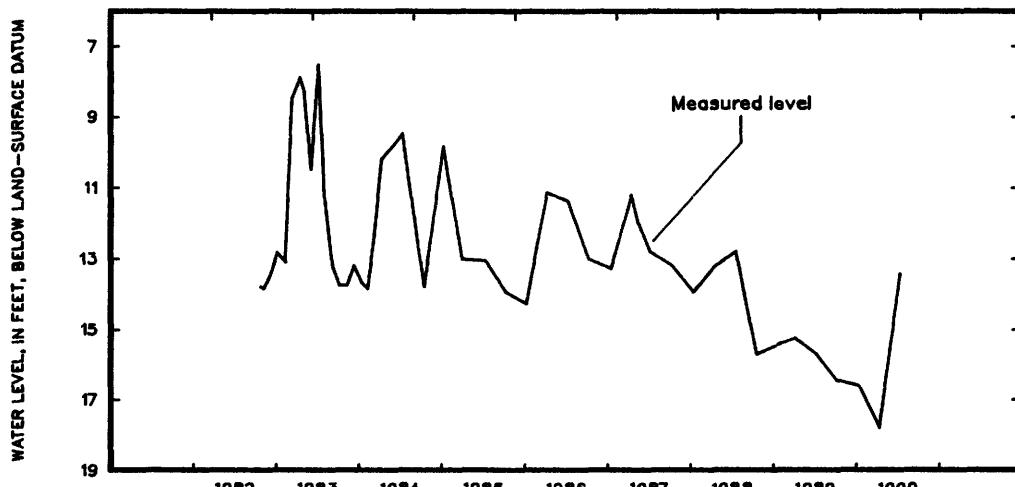
PERIOD OF RECORD.--October 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.57 ft below land-surface datum, July 5, 1983; lowest measured, 17.85 ft below land-surface datum, April 10, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	16.52	JAN 11	16.68	APR 10	17.85	JUL 11	13.45
WATER YEAR 1990	HIGHEST		13.45	JUL 11, 1990		LOWEST	17.85 APR 10, 1990

421018095582001



GROUND-WATER LEVELS

MONONA COUNTY

421006095580301. Local number, 85-44-16 DCDD1.

LOCATION.--Lat $42^{\circ}10'06''$, long $93^{\circ}58'03''$, Hydrologic Unit 10230003, approximately 0.75 mi west of the Town of Ticonic on the north side of County Road E-16. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Little Sioux alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 43 ft, cased to 40 ft, slotted 35-40 ft, gravel-packed. Open to Dakota sandstone 40-43 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,060 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.

REMARKS.--Well WC-156.

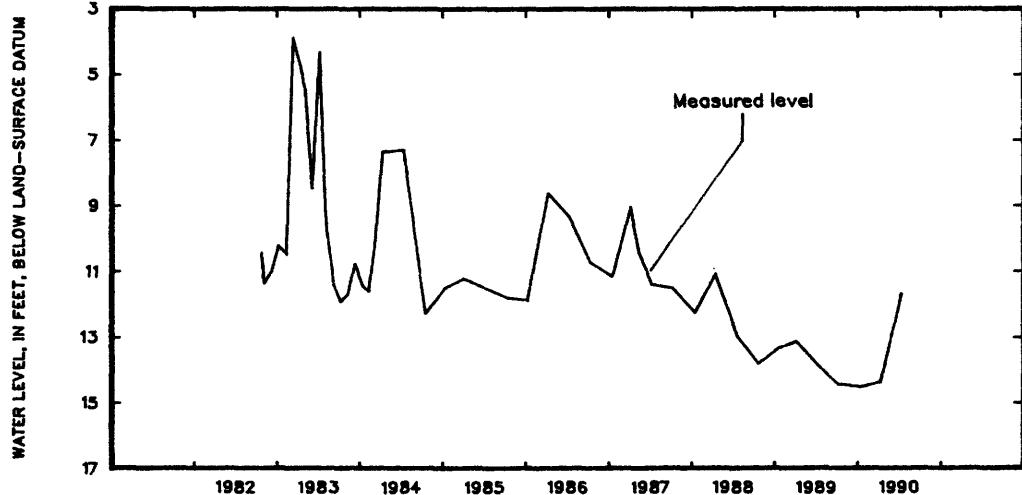
PERIOD OF RECORD.--October 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.92 ft below land-surface datum, March 10, 1983; lowest measured, 14.58 ft below land-surface datum, January 11, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	14.49	JAN 11	14.58	APR 10	14.40	JUL 11	11.72
WATER YEAR 1990	HIGHEST	11.72	JUL 11, 1990	LOWEST	14.58	JAN 11, 1990	

421006095580301



421018095591301. Local number, 85-44-17 DCAA1.

LOCATION.--Lat $42^{\circ}10'18''$, long $95^{\circ}59'13''$, Hydrologic Unit 10230003, approximately 2.5 mi southwest of the Town of Rodney on the north side of County Road L-12. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 135 ft, cased to 135 ft, slotted 115-125 ft, gravel-packed.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,110 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.70 ft above land-surface datum.

REMARKS.--Well WC-158.

PERIOD OF RECORD.--October 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 49.89 ft below land-surface datum, July 11, 1984; lowest measured, 56.81 ft below land-surface datum, July 11, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	55.56	JAN 11	55.99	APR 10	55.10	JUL 11	54.11
WATER YEAR 1990	HIGHEST	54.11	JUL 11, 1990	LOWEST	55.99	JAN 11, 1990	

MONTGOMERY COUNTY

405841095012702. Local number, 71-36-06 DADA2.

LOCATION.--Lat 40°58'41", long 95°01'27", Hydrologic Unit 10240009, located east of dam at Viking Lake State Park, approximately 0.3 mi south of Iowa Highway 34 on the west side of road. Owner: Geological Survey Bureau, DNR, and U.S. Geological Survey.

AQUIFER.--Glacial drift; in material of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 36 ft, cased to 33 ft, screened 33-36 ft.

METHOD.--Monthly measurement with chalked tape by observer and U.S.G.S. personnel.

DATUM.--Elevation of land-surface datum is 1,080 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.28 ft above land-surface datum.

REMARKS.--Viking Lake No. 2 (6J2) well.

PERIOD OF RECORD.--June 1989 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.51 ft below land-surface datum, September 9, 1989; lowest measured, 17.15 ft below land-surface datum, August 15, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1988 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 24, 1989	15.16	OCT 23, 1989	15.88	FEB 21, 1990	15.85	JUL 18, 1990	15.62
JUL 03	15.62	NOV 13	15.86	MAR 23	14.38	20	15.60
05	15.93	21	15.93	27	14.58	31	13.11
22	16.54	DEC 20	16.25	APR 23	15.24	AUG 24	15.67
AUG 15	17.15	26	16.25	MAY 10	15.49	SEP 24	16.54
22	17.07	JAN 03, 1990	15.91	20	14.94	25	16.47
SEP 09	11.51	22	15.85	24	15.07		
25	15.42	FEB 14	15.89	JUN 19	15.12		
OCT 05	15.74	20	15.99	23	15.08		

WATER YEAR 1990 HIGHEST 13.11 JUL 31, 1990 LOWEST 16.54 SEP 24, 1990

410057095075101. Local number, 72-37-29 BABA1.

LOCATION.--Lat 41°00'57", long 95°07'51", Hydrologic Unit 10240005, approximately 4.35 mi east of the City of Red Oak, just south of County Road H-34. Owner: John Ogden.

AQUIFER.--Glacial drift; in material of Pleistocene age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 3 in., depth 40 ft, cased to 40 ft, perforated. Interval of perforation not available.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,275 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.00 ft above land-surface datum.

REMARKS.--None.

PERIOD OF RECORD.--June 1937 to current year.

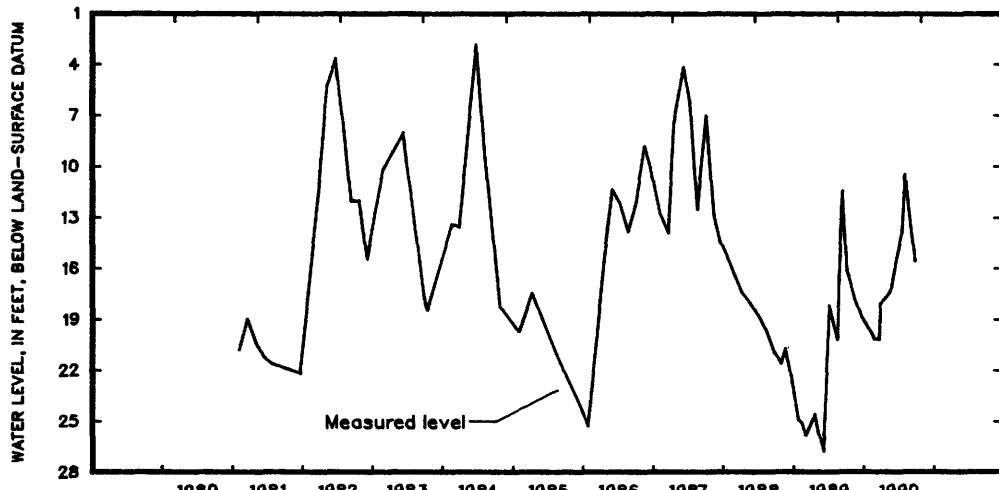
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.94 ft below land-surface datum, June 20, 1984; lowest measured, dry, July 8, 1963 and February 3, 1964.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	16.31	FEB 14	20.05	MAY 10	17.54	JUL 18	13.98
NOV 13	17.95	20	20.29	24	17.16	31	10.58
DEC 20	19.02	MAR 27	18.14	JUN 19	15.45	SEP 24	15.74
JAN 03	19.26						

WATER YEAR 1990 HIGHEST 10.58 JUL 31, 1990 LOWEST 20.29 FEB 20, 1990

410057095075101



MUSCATINE COUNTY

412120091080401. Local number 76-02-30 CBAA1.

LOCATION.--Lat $41^{\circ}21'20''$, long $91^{\circ}08'04''$, Hydrologic Unit 07080101, west of the Town of Fruitland on an Iowa State University Agricultural Experiment Farm. Owner: U.S. Geological Survey.

AQUIFER.--Alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 6 in., depth 27 ft, cased to 24 ft, screened 24-27 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 545 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Base of recorder shelter, 3.70 ft above land-surface datum.

REMARKS.--Water-level recorder removed October 1987.

PERIOD OF RECORD.--May 1966 to current year.

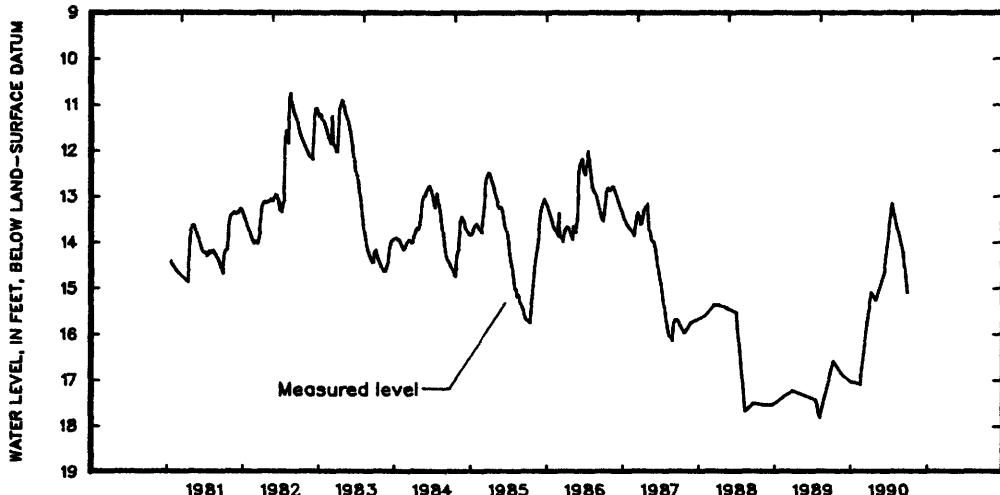
REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 8.51 ft below land-surface datum, May 16, 1973; lowest measured, 17.86 ft below land-surface datum, August 2, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	16.63	FEB 12	17.15	APR 27	15.30	SEP 04	14.25
NOV 13	16.91	MAR 19	15.73	JUN 08	14.66	27	14.52
DEC 28	17.09	APR 06	15.14	JUL 13	13.20		
WATER YEAR 1990		HIGHEST	13.20	JUL 13, 1990		LOWEST	17.15 FEB 12, 1990

412120091080401



O'BRIEN COUNTY

425610085250611. Local number 94-39-26 BADB11.

LOCATION.--Lat $42^{\circ}56'10''$, long $95^{\circ}25'06''$, Hydrologic Unit 10230003, near a dead-end road just south of the Little Sioux River, 0.9 mi north of Iowa Highway 10, approximately 5 mi southeast of the Town of Sutherland. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2.50 in., depth 329 ft, cased to 329 ft, perforated 291-285 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,212 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing at land-surface datum.

REMARKS.--Well D-3.

PERIOD OF RECORD.--April 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 35.25 ft below land-surface datum, June 8, 1986 and January 6, 1987; lowest measured, 36.85 ft below land-surface datum, December 15, 1980.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	36.56	MAR 27	36.64	JUN 11	36.42	SEP 20	36.36
WATER YEAR 1990		HIGHEST	36.36	SEP 20, 1990		LOWEST	36.64 MAR 27, 1990

O'BRIEN COUNTY

425808095480311. Local number, 94-42-09 DDDDI11.

LOCATION.--Lat 42°58'08", long 95°48'03", Hydrologic Unit 10230003, west of Iowa Highway 143, 1 mi west and 1 mi north of the Village of Germantown. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 638 ft, cased to 638 ft, perforated 516-536 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,440 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.

REMARKS.--Well D-42.

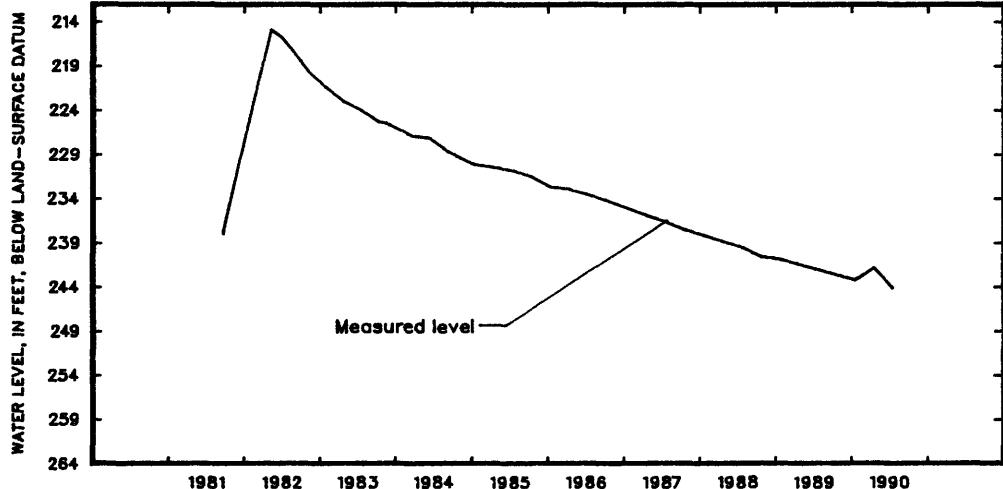
PERIOD OF RECORD.--July 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 215.09 ft below land-surface datum, May 6, 1982; lowest measured, 260.64 ft below land-surface datum, July 10, 1980.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	242.82	JAN 10	243.46	APR 11	241.99	JUL 12	244.40
WATER YEAR 1990	HIGHEST	241.99	APR 11, 1990	LOWEST	244.40	JUL 12, 1990	

425808095480311



430930095350401. Local number, 96-40-05 DDDAI.

LOCATION.--Lat 43°08'30", long 95°35'04", Hydrologic Unit 10230003, approximately 3 mi east of the Town of Sanborn and 2 mi south of U.S. Highway 18. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Ordovician and Dakota: in sandy shale of Ordovician age and sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 701 ft, cased to 701 ft, perforated 661-701 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,560 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.

REMARKS.--Well D-41.

PERIOD OF RECORD.--June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 358.39 ft below land-surface datum, July 8, 1986; lowest measured, 361.40 ft below land-surface datum, July 16, 1980.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	360.28	JAN 10	359.92	APR 11	359.99	JUL 12	360.35
WATER YEAR 1990	HIGHEST	359.92	JAN 10, 1990	LOWEST	360.35	JUL 12, 1990	

GROUND-WATER LEVELS

OSCEOLA COUNTY

431620095250501. Local number, 98-39-26 CDAD1.

LOCATION.--Lat 43°16'20", long 95°25'05", Hydrologic Unit 10230003, 3.5 mi south and 2.5 mi east of the Village of May City. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Cambrian-Ordovician: in St. Peter sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 662 ft, cased to 662 ft, perforated 622-662 ft.

METHOD.--Intermittent measurement with chalked tape by observer or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,402 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of low pipe, 1.47 ft above land-surface datum.

REMARKS.--Well D-38, Deep Hibbing.

PERIOD OF RECORD.--June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 197.68 ft below land-surface datum, May 8, 1984; lowest measured, 199.52 ft below land-surface datum, August 5, 1980.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 20	192.96	MAR 28	197.32	JUN 12	198.09	SEP 19	199.50
WATER YEAR 1990		HIGHEST	192.96	NOV 20, 1989		LOWEST	199.50
					SEP 19, 1990		

431620095250511. Local number, 98-39-26 CDAD11.

LOCATION.--Lat 43°16'20", long 95°25'05", Hydrologic Unit 10230003, 3.5 mi south and 2.5 mi east of the Village of May City. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 345 ft, cased to 345 ft, perforated 335-345 ft.

METHOD.--Intermittent measurement with chalked tape by observer or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,402 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of high pipe, 2.60 ft above land-surface datum.

REMARKS.--Well D-38, Shallow Hibbing.

PERIOD OF RECORD.--June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 192.20 ft below land-surface datum, September 10, 1981; lowest measured, 194.18 ft below land-surface datum, November 20, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 20	194.18	MAR 28	194.12	JUN 12	193.63	SEP 19	194.12
WATER YEAR 1990		HIGHEST	193.63	JUN 12, 1990		LOWEST	194.18
					NOV 20, 1989		

431613095251801. Local number, 98-39-26 CDCC1.

LOCATION.--Lat 43°16'13", long 95°25'18", Hydrologic Unit 10230003, 3.5 mi south and 2.5 mi east of the Village of May City. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 500 ft, cased to 500 ft, perforated 490-500 ft.

METHOD.--Intermittent measurement with chalked tape by observer or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,398 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.70 ft above land-surface datum.

REMARKS.--Well D-39.

PERIOD OF RECORD.--June 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 189.99 ft below land-surface datum, June 17, 1980; lowest measured, 196.85 ft (nearby well pumping) below land-surface datum, September 6, 1984.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 20	191.73	MAR 28	191.82	JUN 12	191.37	SEP 19	192.23
WATER YEAR 1990		HIGHEST	191.37	JUN 12, 1990		LOWEST	192.23
					SEP 19, 1990		

OSCEOLA COUNTY

431620095482402. Local number, 98-42-33 AAB2.

LOCATION.--Lat 43°16'20", long 95°48'24", Hydrologic Unit 10170204, approximately 2.75 mi south of the Town of Ashton, west of Iowa Highway 60, near the Chicago and Northwestern Railroad tracks. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 400 ft, cased to 400 ft, perforated 385-395 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,440 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.80 ft above land-surface datum.

REMARKS.--Well D-40.

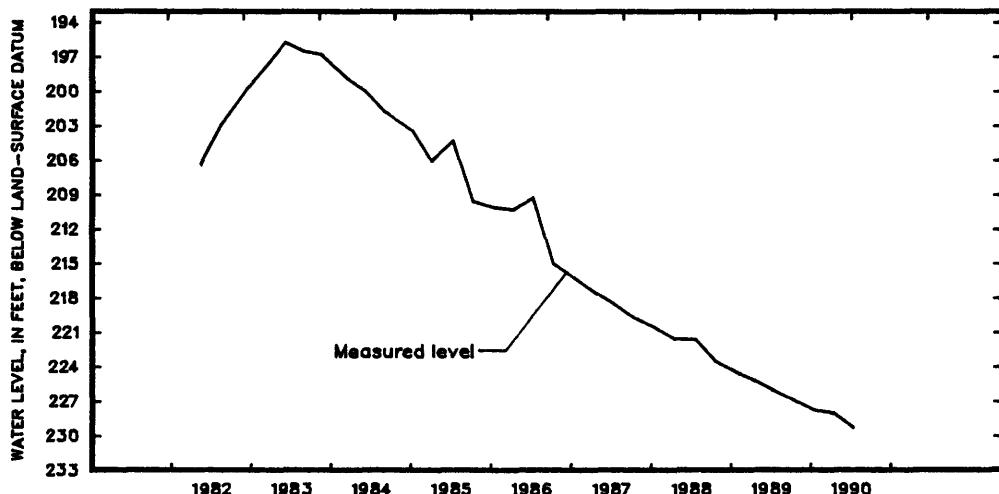
PERIOD OF RECORD.--May 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 195.87 ft below land-surface datum, June 1, 1983; lowest measured, 229.50 ft below land-surface datum, July 12, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	227.02	JAN 10	227.91	APR 11	228.22	JUL 12	229.50
WATER YEAR 1990	HIGHEST	227.02	OCT 04, 1989	LOWEST	229.50	JUL 12, 1990	

431620095482402



432828095283611. Local number, 100-39-17 DCCB11.

LOCATION.--Lat 43°28'28", long 95°28'36", Hydrologic Unit 10230003, approximately 2 mi west and 2 mi north of the Town of Harris, east of County Road M-12. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in. to 461 ft, 4 in. to 760 ft, depth 760 ft, cased to 760 ft, perforated 680-700 ft.

METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,560 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.00 ft above land-surface datum.

REMARKS.--Well D-13.

PERIOD OF RECORD.--July 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 341.80 ft below land-surface datum, August 5, 1980; lowest measured, 344.88 ft below land-surface datum, January 18, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

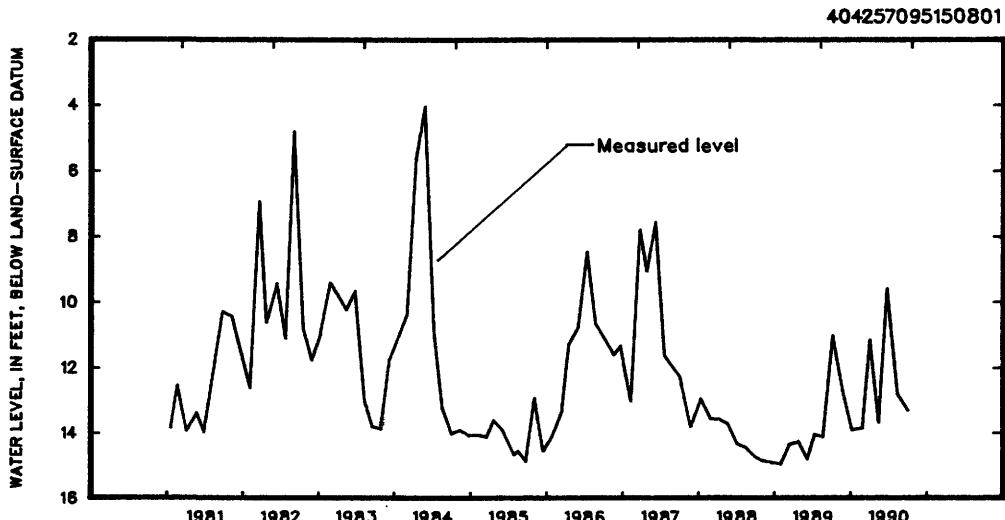
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 20	344.32	MAR 28	344.29	JUN 12	343.97	SEP 19	344.42
WATER YEAR 1990	HIGHEST	343.97	JUN 12, 1990	LOWEST	344.42	SEP 19, 1990	

PAGE COUNTY

404257095150801. Local number, 68-38-07 CCAA1.
LOCATION.--Lat 40° 42' 57", long 95° 15' 08", Hydrologic Unit 10240005, approximately 2 mi south of the Village of Norwich and 1.5 mi west of County Road M-48. Owner: William Brayman.
AQUIFER.--Glacial drift; in material of Pleistocene age.
WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 12 in., depth 44 ft, lined with tile.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,087 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of pipe inserted through board cover, 1.00 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--May 1934 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.09 ft below land-surface datum, March 26, 1946; lowest measured, 22.76 ft below land-surface datum, June 23, 1947.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	
OCT 03	11.07	JAN 04	13.97	MAR 30	11.20	JUN 20	9.64	
NOV 21	12.78	FEB 22	13.88	MAY 11	13.73	AUG 10	12.89	
						SEP 28	13.38	
WATER YEAR 1990		HIGHEST	9.64	JUN 20	1990	LOWEST	13.97	JAN 04, 1990



PLYMOUTH COUNTY

4424850096074801. Local number, 92-45-02 CBCB1.
LOCATION.--Lat 42°48'50", long 96°07'48", Hydrologic Unit 10230002, approximately 3.8 mi west and 0.6
mi south of the Village of Oyens. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Cambrian-Ordovician: in dolomite of Cambrian and Ordovician age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in. to 161 ft, 4 in. to 598
ft, 2 in. to 1,340 ft, depth 1,340 ft, cased to 598 ft, open hole 598-1,340 ft. Well deepened from
1,089 to 1,340 ft in May, 1984. Well penetrates Precambrian-aged rocks.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,245 ft above National Geodetic Vertical Datum of 1929, from
topographic map. Measuring point: Top of casing, 2.80 ft above land-surface datum.
REMARKS.--Well D-21.
PERIOD OF RECORD.--May 1979 to January 1981, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 86.38 ft below land-surface datum, October
8, 1987; lowest measured, 102.10 ft below land-surface datum, August 6, 1980.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	91.55	JAN 09	90.59	APR 11	92.55	JUL 12	77.71
WATER YEAR 1990		HIGHEST	77.71	JUL 12, 1990	LOWEST	92.55	APR 11, 1990

PLYMOUTH COUNTY

424833096324701. Local number, 92-48-06 DDDA1.

LOCATION.--Lat 42° 48' 33", long 96° 32' 47", Hydrologic Unit 10170203, just south of the curve on Iowa Highway 3, 1 mi south of the Town of Akron. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, depth 581 ft, diameter 4 in. to 184 ft, 2 in. to 581 ft, cased to 576 ft, perforated 430-434 ft and 510-515 ft, open hole 576-581 ft. Paleozoic rock open 576-581 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,282 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.80 ft above land-surface datum.

REMARKS.--Well D-35.

PERIOD OF RECORD.--December 1979 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 137.35 ft below land-surface datum, April 22, 1987; lowest measured, 159.82 ft below land-surface datum, August 6, 1980.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	138.26	FEB 13	138.22	JUL 11	138.15	SEP 26	138.52
DEC 28	138.28	APR 11	138.25				

WATER YEAR 1990 HIGHEST 138.15 JUL 11, 1990 LOWEST 138.52 SEP 26, 1990

425249096125001. Local number, 93-46-12 DDDD1.

LOCATION.--Lat 42° 52' 49", long 96° 12' 50", Hydrologic Unit 10230002, 1 mi west and 1 mi south of the Village of Struble. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2.5 in., depth 570 ft, cased to 570 ft, perforated 356-360 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,280 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of coupling, 4.80 ft above land-surface datum.

REMARKS.--Well D-2.

PERIOD OF RECORD.--March 1980 to December 1980, May 1982 to current year.

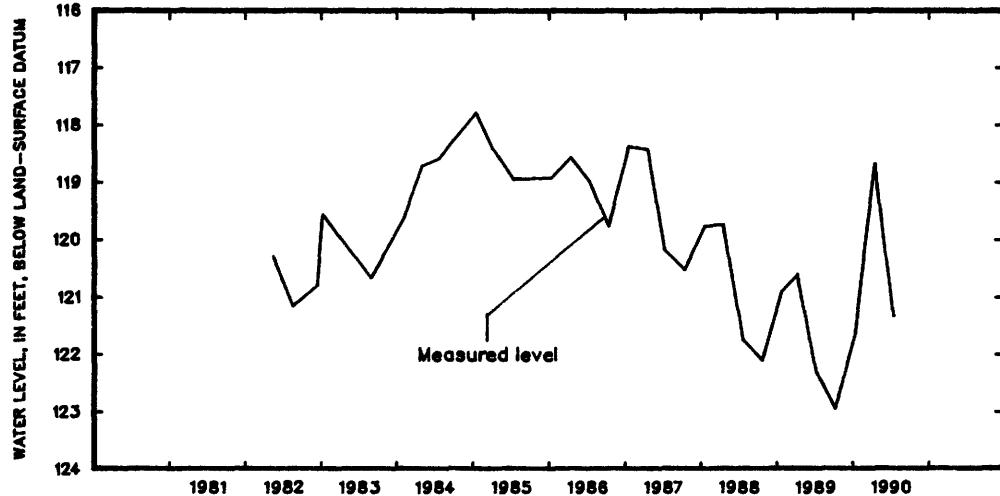
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 117.78 ft below land-surface datum, April 9, 1980; lowest measured, 122.97 ft below land-surface datum, October 3, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	122.97	JAN 09	121.63	APR 11	118.70	JUL 12	121.37

WATER YEAR 1990 HIGHEST 118.70 APR 11, 1990 LOWEST 122.97 OCT 03, 1989

425249096125001



GROUND-WATER LEVELS

POTTAWATTAMIE COUNTY

411024095095502. Local number, 74-38-36 BAAA2.

LOCATION.--Lat $41^{\circ}10'24''$, long $95^{\circ}09'55''$, Hydrologic Unit 10240003, approximately 1.5 mi north of the Town of Elliott on the southwest corner of the junction of County Roads M-55 and G-66. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--East Nishnabotna alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 40 ft, cased 34-39 ft, gravel-packed. Original depth was 101 ft, back-filled with sand and a bentonite seal to 40 ft.

METHOD.--Twice a month measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 1,073 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.

REMARKS.--Well SW-34 B/L.

PERIOD OF RECORD.--August 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.07 ft below land-surface datum, September 10, 1989; lowest measured, 9.95 ft below land-surface datum, May 25, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	8.64	DEC 27	9.57	MAR 11	9.20	MAY 28	4.10
25	8.97	JAN 10	9.61	25	7.97	JUN 13	6.57
NOV 10	9.18	25	9.70	APR 10	8.58	AUG 26	6.5
28	9.44	FEB 10	9.77	26	8.88	SEP 29	8.6
DEC 12	9.50	26	9.83	MAY 10	6.58		

WATER YEAR 1990 HIGHEST 4.10 MAY 28, 1990 LOWEST 9.83 FEB 26, 1990

411359095171901. Local number, 74-39-01 CCCC1.

LOCATION.--Lat $41^{\circ}13'59''$, long $95^{\circ}17'19''$, Hydrologic Unit 10240002, approximately 6.5 mi east of the Town of Carson, on the northeast corner of the junction of Iowa Highway 92 and County Road M-41. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in., depth 216 ft, cased to 206 ft, slotted 189-206 ft, gravel-packed, open to Pennsylvanian shale 207-216 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,245 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.32 ft above land-surface datum.

REMARKS.--Well SW-21.

PERIOD OF RECORD.--August 1986 to current year.

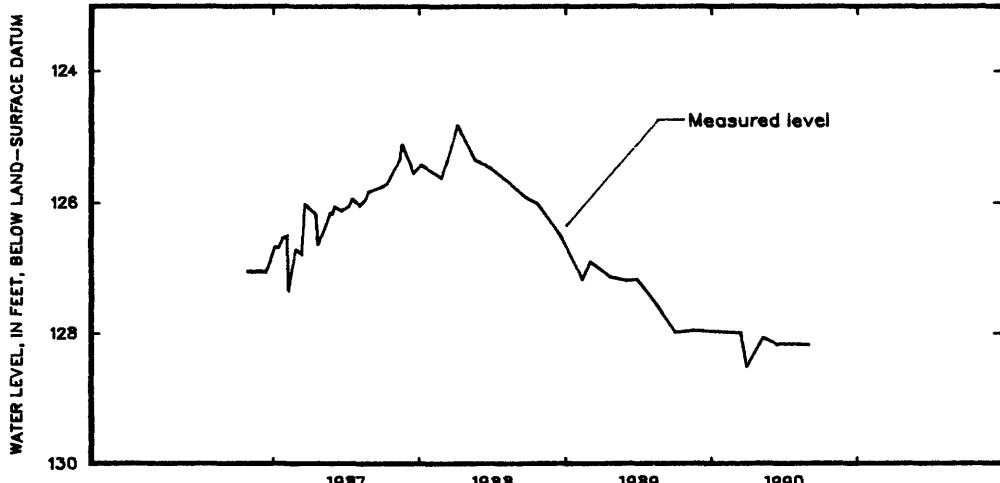
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 124.86 ft below land-surface datum, April 4, 1988; lowest measured, 128.54 ft below land-surface datum, March 27, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
NOV 15	127.98	MAR 27	128.54	JUN 19	128.18	AUG 31	128.21
MAR 13	128.03	MAY 08	128.09				

WATER YEAR 1990 HIGHEST 127.98 NOV 15, 1989 LOWEST 128.54 MAR 27, 1990

411359095171901



POTTAWATTAMIE COUNTY

411246095502001. Local number, 74-43-18 BCCCI.

LOCATION.--Lat 41°12'46", long 95°50'20", Hydrologic Unit 10230006, approximately 0.4 mi east of Lake Manawa in Manawa State Park, 1.4 mi south of Interstate 80, south of the City of Council Bluffs. Owner: U.S. Geological Survey.

AQUIFER.--Alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1.25 in., depth 16 ft, cased to 14 ft, sand point 14-16 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 975 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.25 ft above land-surface datum.

REMARKS.--None.

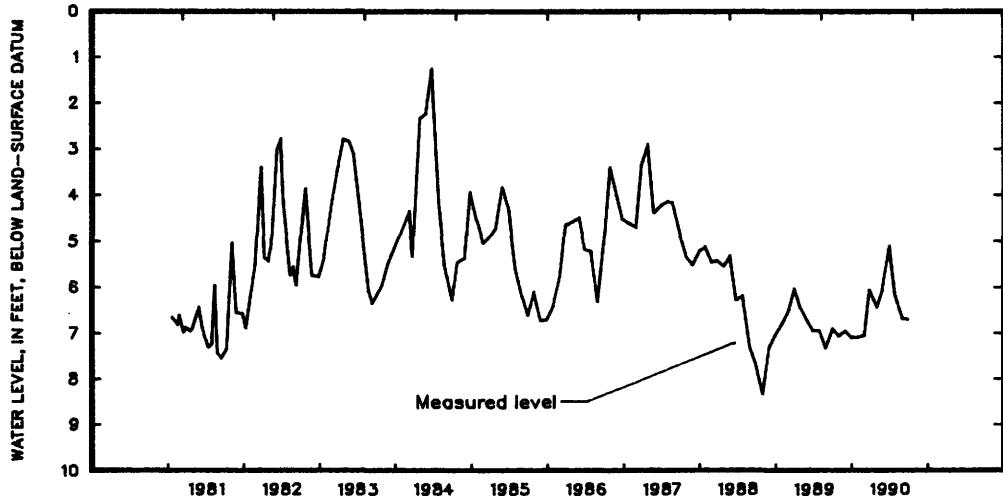
PERIOD OF RECORD.--November 1950 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.45 ft below land-surface datum, May 2, 1951; lowest measured, 11.86 ft below land-surface datum, June 26, 1956.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 26	7.11	JAN 24	7.13	APR 27	6.48	JUL 25	6.24
NOV 27	6.99	FEB 27	7.08	MAY 24	6.10	AUG 27	6.73
DEC 26	7.15	MAR 23	6.10	JUN 28	5.15	SEP 24	6.75
WATER YEAR 1990	HIGHEST	5.15	JUN 28, 1990	LOWEST	7.15	DEC 26, 1989	

411246095502001



SAC COUNTY

422500095084801. Local number, 88-37-22 CCCC1.

LOCATION.--Lat 42°25'00", long 95°08'48", Hydrologic Unit 10230007, approximately 3 mi south of the Town of Early or 0.5 mi south of the junction of U.S. Highways 20 and 71. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Pennsylvanian and Dakota: in limestone of Pennsylvanian age and sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 435 ft, cased to 435 ft, perforated 417-435 ft.

METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,320 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.

REMARKS.--Well D-16.

PERIOD OF RECORD.--December 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 163.93 ft below land-surface datum, May 12, 1984; lowest measured, 165.40 ft below land-surface datum, December 16, 1980 and March 29, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 17	165.22	MAR 29	165.40	JUN 12	164.72	SEP 20	165.11
WATER YEAR 1990	HIGHEST	164.72	JUN 12, 1990	LOWEST	165.40	MAR 29, 1990	

SAC COUNTY

422850095171501. Local number, 89-38-36 CBCC1.

LOCATION--Lat 42° 28' 50", long 95° 17' 15", Hydrologic Unit 10230005, just east of Iowa Highway 110, 0.75 mi south of the Town of Schaller and 0.25 mi north of U.S. Highway 20. Owner: Geological Survey Bureau DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.—Drilled observation artesian water well, diameter 2 in., depth 522 ft, perforated 410-430 ft, open hole 512-521 ft. Open to 9 ft of Paleozoic rock.

METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.

DATUM.--Elevation of land surface datum is 1,445 ft above National Geodetic Vertical Datum.

topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.

REMARKS.--Well D-17.

PERIOD OF RECORD.--December 1978 to current year.
EXTREMES FOR PERIOD OF RECORD--Highest water level

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 288.05 ft below land-surface datum, June 2, 1980; lowest measured, 292.46 ft below land-surface datum, June 12, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 17	291.84	MAR 29	291.90	JUN 12	292.46	SEP 20	291.89
WATER YEAR 1990		HIGHEST	291.84	NOV 17, 1989	LOWEST	292.46	JUN 12, 1990

SCOTT COUNTY

413544090212901. Local number, 78-5E-03 AADA1.

LOCATION--Lat 41°35'44", long 90°21'29", Hydrologic Unit 07080101, at the Bridgeview Elementary School corner of 12th and Davenport Streets, Le Claire. Owner: City of Le Claire.

AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian and sandstone and sandy dolomite of Early Ordovician age.

WELL CHARACTERISTICS.--Drilled unused municipal art.

ft., cased to 1,128 ft., open hole 1,128-1,607 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 703 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 2.11 ft above land-surface datum.

REMARKS - The Claines Well No. 3

REMARKS.--Le Claire Well No. 3.
PERIOD OF RECORD --July 1975 to current year

PERIOD OF RECORD--July 1975 to current year.
REVISED RECORDS.--WWD IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 247.46 ft below land-surface datum, July 8, 1975; lowest recorded, 276.88 ft below land-surface datum, September 1, 1978.

REVISION--Lowest water level recorded. 276.88 ft below land-surface datum, September 1, 1978.

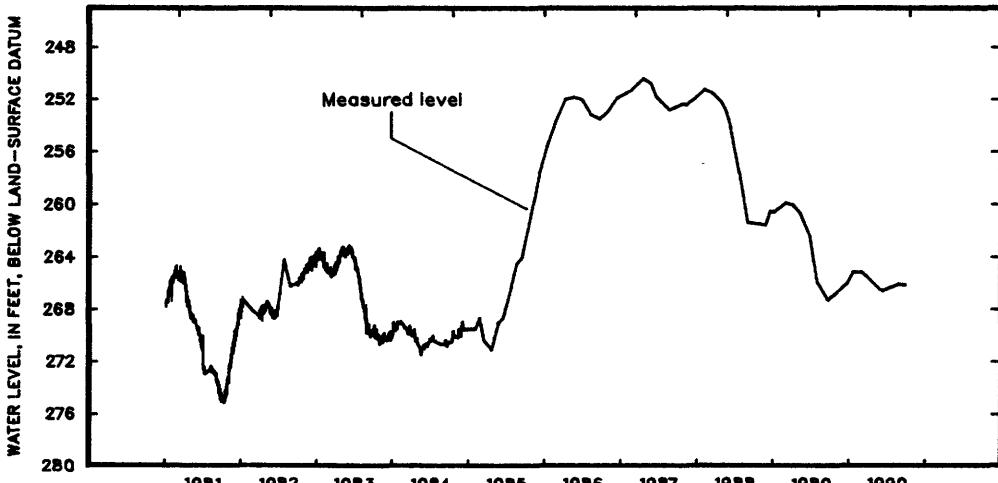
REVISION. Lowest water level recorded, 2.0.0.10 below bank elevation, 1000 ft. above sea level.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 19	266.14	FEB 26	265.29	JUL 06	266.75	SEP 24	266.33
JAN 16	265.28	MAY 21	266.63	AUG 20	266.21		
WATER YEAR 1990		HIGHEST	265.28	JAN 16, 1990	LOWEST	266.75	JUL 06, 1990

WATER YEAR 1990 HIGHEST 265.28 JAN 16, 1990 LOWEST 266.75 JUL 06, 1990

413544090212901



SHELBY COUNTY

413255095070401. Local number, 78-37-17 DDDDI.

LOCATION.--Lat 41°32'55", long 95°07'04", Hydrologic Unit 10240003, 3 mi south and 3 mi west of the Town of Elkhorn on the east side of County Road M-56 near Elkhorn Creek. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 181 ft, cased to 181 ft, slotted 121-179 ft, gravel-packed, open to Pennsylvanian shale and limestone 140-181 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,208 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.80 ft above land-surface datum.

REMARKS.--Well WC-16.

PERIOD OF RECORD.--August 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 37.33 ft below land-surface datum, October 9, 1987; lowest measured, 42.86 ft below land-surface datum, September 24, 1981.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	40.61	JAN 12	41.70	APR 12	41.77	JUL 13	39.90
WATER YEAR 1990	HIGHEST	39.90	JUL 13, 1990	LOWEST	41.77	APR 12, 1990	

413442095193101. Local number, 78-39-10 BBBAl.

LOCATION.--Lat 41°34'42", long 95°19'31", Hydrologic Unit 10240002, approximately 4.5 mi south of the City of Harlan and 0.25 mi east of the Town of Corely on the north side of County Road F-58. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--West Nishnabotna alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 44 ft, cased to 44 ft, slotted 40-44 ft, gravel-packed.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,168 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.

REMARKS.--Well WC-200.

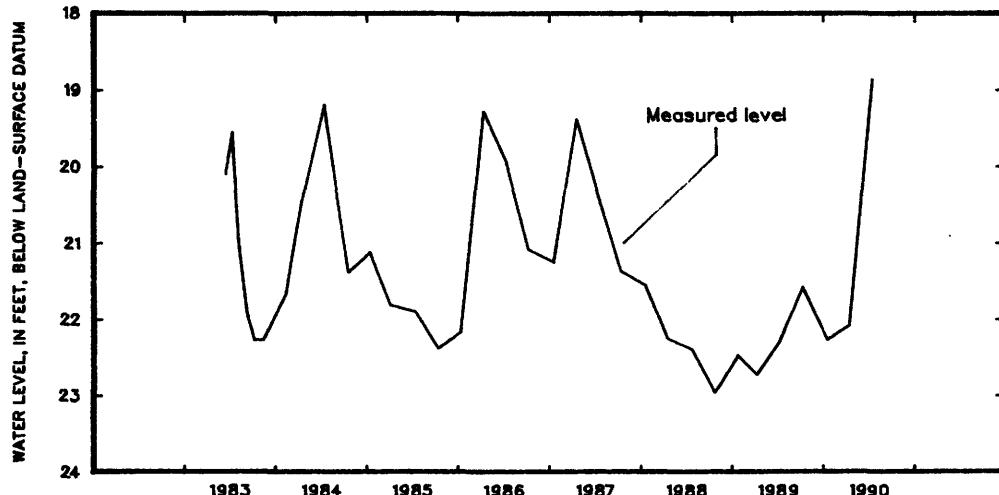
PERIOD OF RECORD.--June 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.97 ft below land-surface datum, July 9, 1986; lowest measured, 22.98 ft below land-surface datum, October 19, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	21.59	JAN 12	22.29	APR 12	22.09	JUL 13	18.87
WATER YEAR 1990	HIGHEST	18.87	JUL 13, 1990	LOWEST	22.29	JAN 12, 1990	

413442095193101



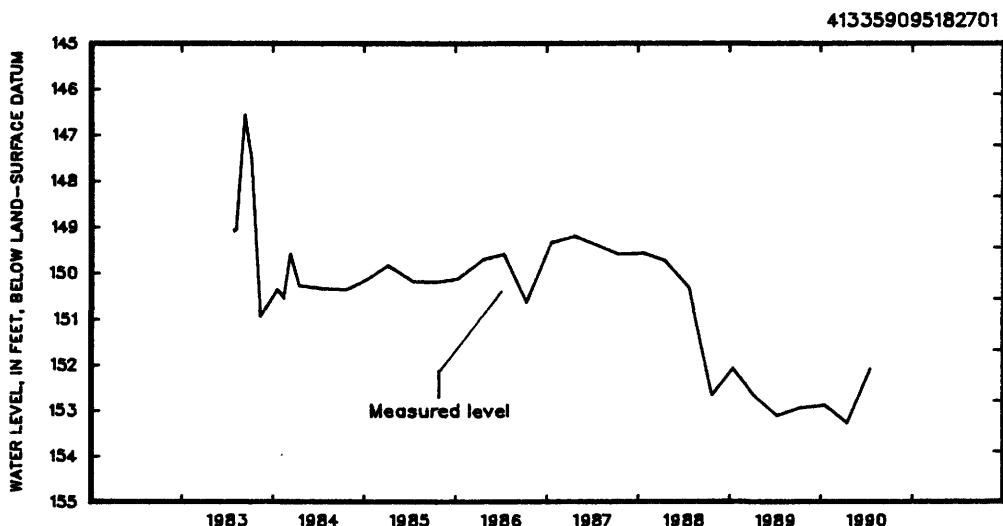
GROUND-WATER LEVELS

SHELBY COUNTY

413359095182701. Local number, 78-39-11 CCBC1.
 LOCATION.--Lat $41^{\circ}33'59''$, long $95^{\circ}18'27''$, Hydrologic Unit 10240002, approximately 5.5 mi south of the City of Harlan, 0.75 mi south of County Road F-58, and 1.5 mi east of U.S. Highway 59. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Fremont buried channel: in sand and gravel of Pleistocene age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 541 ft, cased to 541 ft, slotted 520-535 ft, gravel-packed. Open to Pennsylvanian shale 537-541 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,310 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.65 ft above land-surface datum.
 REMARKS.--Well WC-227.
 PERIOD OF RECORD.--July 1983 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 146.61 ft below land-surface datum, September 6, 1983; lowest measured, 153.77 ft below land-surface datum, July 13, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	152.97	JAN 12	152.91	APR 12	153.32	JUL 13	152.12
WATER YEAR 1990	HIGHEST	152.12	JUL 13, 1990	LOWEST	153.32	APR 12, 1990	



413031095204901. Local number, 78-39-32 DDAA1.
 LOCATION.--Lat $41^{\circ}30'31''$, long $95^{\circ}20'49''$, Hydrologic Unit 10240002, approximately 2 mi north of the Town of Avoca, 0.60 mi west of U.S. Highway 59. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--West Nishnabotna alluvial: in sand and gravel of Holocene age.
 WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 27 ft, cased to 24 ft, slotted 21-24 ft, gravel-packed, open hole 24-27 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,144 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.95 ft above land-surface datum.
 REMARKS.--Well WC-197.
 PERIOD OF RECORD.--June 1983 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.04 ft below land-surface datum, July 10, 1984; lowest measured, 18.17 ft below land-surface datum, July 5, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	16.74	JAN 12	17.25	APR 12	17.02	JUL 13	8.98
WATER YEAR 1990	HIGHEST	8.98	JUL 13, 1990	LOWEST	17.25	JAN 12, 1990	

SHELBY COUNTY

414624095252301. Local number, 80-39-06 AADC1.

LOCATION.--Lat $41^{\circ}46'24''$, long $95^{\circ}25'23''$, Hydrologic Unit 10230006, west of the Town of Earling on the north side of Iowa Highway 37 near the junction of Iowa Highways 37 and 191. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 370 ft, cased to 370 ft, slotted 332-347 ft, open to Pennsylvanian sandstone, shale, and limestone 347-370 ft.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,305 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.60 ft above land-surface datum.

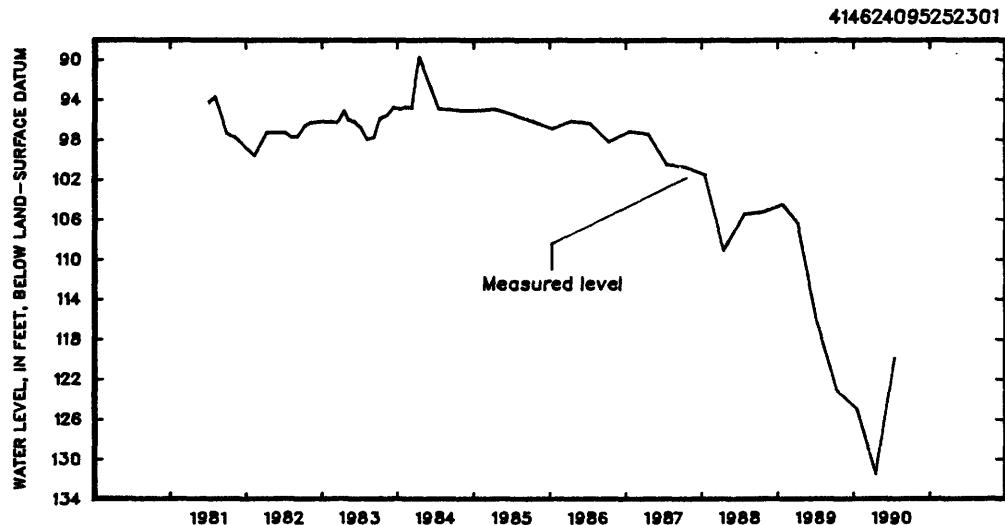
REMARKS.--Well WC-10.

PERIOD OF RECORD.--June 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 93.87 ft below land-surface datum, July 28, 1981; lowest measured, 131.70 ft below land-surface datum, April 12, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	123.29	JAN 12	125.19	APR 12	131.70	JUL 13	120.01
WATER YEAR 1990	HIGHEST	120.01	JUL 13, 1990	LOWEST	131.70	APR 12, 1990	



414856095160101. Local number, 81-38-21 ADAD1.

LOCATION.--Lat $41^{\circ}48'56''$, long $95^{\circ}16'01''$, Hydrologic Unit 10240002, approximately 3.75 mi east of the Town of Defiance on the west side of County Road M-36. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Fremont buried channel: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 535 ft, cased to 535 ft, slotted 525-535 ft, gravel-packed. Open to Pennsylvanian shale 530-535 ft.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.90 ft above land-surface datum.

REMARKS.--Well WC-222.

PERIOD OF RECORD.--August 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 208.09 ft below land-surface datum, April 15, 1987; lowest measured, 211.08 ft below land-surface datum, January 12, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	210.80	JAN 12	211.08	APR 12	211.05	JUL 13	210.36
WATER YEAR 1990	HIGHEST	210.36	JUL 13, 1990	LOWEST	211.08	JAN 12, 1990	

SIOUX COUNTY

430140095573101. Local number, 95-43-07 AAAA1.
 LOCATION.--Lat 43°04'10", long 95°57'32", Hydrologic Unit 10230002, just south of County Road B-40, 1 mi east of the Village of Newkirk. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Dakota: in sandstone of Cretaceous age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 681 ft, cased to 681 ft, perforated 641-681 ft. Open to Paleozoic rock from 674-681 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,390 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.70 ft above land-surface datum.
 REMARKS.--Well D-43.
 PERIOD OF RECORD.--July 1980 to December 1980, May 1982 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 213.66 ft below land-surface datum, March 13, 1984; lowest measured, 218.24 ft below land-surface datum, October 8, 1987.
 REVISION.--Highest water level measured, 213.66 ft below land-surface datum, March 13, 1984.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	217.96	JAN 09	217.65	APR 11	217.50	JUL 12	217.76
WATER YEAR 1990	HIGHEST	217.50	APR 11, 1990	LOWEST	217.96	OCT 04, 1989	

430913096033201. Local number, 96-44-08 ADAAA1.
 LOCATION.--Lat 43°09'13", long 96°03'32", Hydrologic Unit 10230002, west side of County Road K-64, approximately 2.5 mi west of the Town of Boyden and approximately 2.2 mi south of U.S. Highway 18. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
 AQUIFER.--Dakota: in sandstone of Cretaceous age.
 WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 682 ft, cased to 682 ft, perforated 647-667 ft. Open to Paleozoic rock 681-682 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,373 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.70 ft above land-surface datum.
 REMARKS.--Well D-44.
 PERIOD OF RECORD.--August 1980 to December 1980, May 1982 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 187.85 ft below land-surface datum, October 16, 1984; lowest measured, 195.86 ft below land-surface datum, October 4, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	195.86	JAN 09	195.22	APR 11	195.38	JUL 12	195.36
WATER YEAR 1990	HIGHEST	195.22	JAN 09, 1990	LOWEST	195.86	OCT 04, 1989	

STORY COUNTY

420137093361501. Local number, 83-24-02 DBAD1.
 LOCATION.--Lat 42°01'37", long 93°36'15", Hydrologic Unit 07080105, in Ames, north of the Chicago and Northwestern Railroad and County Road E-41, approximately 0.75 mi east of U.S. Highway 69. Owner: City of Ames.
 AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.
 WELL CHARACTERISTICS.--Drilled municipal well, depth 124 ft, casing information unavailable.
 METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
 DATUM.--Elevation of land-surface datum is 926 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.82 ft above land-surface datum.
 REMARKS.--City well #4.
 PERIOD OF RECORD.--September 1987 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 52.65 ft below land-surface datum, March 12, 1990; lowest measured, 64.74 ft below land-surface datum, August 24, 1990.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 20	59.86	MAR 12	57.94	JUN 08	52.65	AUG 24	64.74
WATER YEAR 1990	HIGHEST	52.65	JUN 08, 1990	LOWEST	64.74	AUG 24, 1990	

VAN BUREN COUNTY

404150091483001. Local number, 68-08-08 CDD.

LOCATION.--Lat 40° 41' 53", long 91° 48' 20", Hydrologic Unit 07100009, located at the west end of the park in the City of Bonaparte, south of County Road J-40. Owner: City of Bonaparte.

AQUIFER.--Mississippian: in limestone and dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused semi-confined public-supply well, diameter 6 in., depth 205 ft, cased to 18 ft, open hole 18-205 ft.

INSTRUMENTATION.--Analog digital recorder.

DATUM.--Elevation of land-surface datum is 552 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder platform, 0.65 ft above land-surface datum.

REMARKS.--Bonaparte No. 1 well. Recorder removed July 17, 1990.

PERIOD OF RECORD.--August 1988 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 16.10 ft below land-surface datum, June 18, 1990; lowest measured, 32.13 ft below land-surface datum, August 16, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEARS OCTOBER 1988 TO SEPTEMBER 1990
NOON VALUES

WATER YEAR 1989

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	----	----	----	26.08	28.71	25.44	24.22	23.72	24.64	26.20	28.62	25.39
10	----	----	----	24.90	26.50	24.66	24.67	24.18	25.98	28.54	28.55	23.98
15	----	----	----	25.44	24.83	23.69	24.32	24.64	24.17	27.24	29.44	24.36
20	----	----	24.71	24.51	26.10	24.90	24.98	26.82	26.27	26.20	27.92	26.00
25	----	25.85	24.93	25.97	24.01	26.43	26.90	26.48	30.13	27.15	24.60	
EOM	----	25.38	24.26	25.68	24.34	25.17	24.73	26.47	27.70	26.70	25.19	

WATER YEAR 1990

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	24.03	23.66	24.60	24.54	24.42	23.40	21.95	20.27	18.71	17.27	-----	-----
10	23.80	23.56	24.67	24.39	23.86	22.85	21.81	20.95	19.40	17.95	-----	-----
15	25.81	23.69	26.33	24.35	24.45	19.79	21.80	20.32	19.56	17.47	-----	-----
20	24.24	24.01	28.05	24.86	24.29	20.45	21.75	20.69	17.58	-----	-----	-----
25	24.68	24.04	25.06	24.58	23.90	21.79	23.25	18.62	17.70	-----	-----	-----
EOM	23.76	24.66	24.24	24.56	23.87	21.94	20.98	18.68	17.54	-----	-----	-----

WASHINGTON COUNTY

411300091320701. Local number, 74-06-15 BDAC1.

LOCATION.--Lat 41° 13' 00", long 91° 32' 07", Hydrologic Unit 07080107, in the water treatment plant, beneath the water tower in Crawfordsville. Owner: Town of Crawfordsville.

AQUIFER.--Mississippian: in dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused municipal artesian water well, diameter 6.5 in., depth 215 ft, cased to 132 ft, open hole 132-215 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 725 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.10 ft above land-surface datum.

REMARKS.--Water level for September 13, 1983, 72.69 ft below land-surface datum.

PERIOD OF RECORD.--September 1983, March 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 69.23 ft below land-surface datum, March 25, 1987; lowest measured, 76.22 ft below land-surface datum, September 5, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
OCT 05	75.45	JAN 02	74.96	APR 23	73.71	JUN 07	74.70
NOV 02	75.42	FEB 20	74.39	MAY 15	73.78	AUG 06	74.11
DEC 04	74.65	MAR 02	73.99				

WATER YEAR 1990 HIGHEST 73.71 APR 23, 1990 LOWEST 75.45 OCT 05, 1989

411244091323501. Local number, 74-06-15 CBDD1.

LOCATION.--Lat 41° 12' 41", long 91° 32' 19", Hydrologic Unit 07080107, just west of U.S. Highway 218, approximately 0.4 mi southeast of the water tower in Crawfordsville. Owner: Town of Crawfordsville.

AQUIFER.--Mississippian: in dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused municipal artesian water well, diameter 8 in., depth 217 ft, cased to 142 ft, open hole 142-217 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 725 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.67 ft above land-surface datum.

REMARKS.--Water level for Sep. 13, 1983, 75.46 ft below land-surface datum.

PERIOD OF RECORD.--September 1983, March 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 71.62 ft below land-surface datum, March 25, 1987; lowest measured, 78.50 ft below land-surface datum, September 5, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
OCT 05	74.88	JAN 02	77.18	APR 23	75.86	JUL 09	75.96
NOV 02	77.69	FEB 20	76.67	MAY 15	75.88	AUG 06	76.19
DEC 04	76.89	MAR 02	76.24	JUN 07	75.83	SEP 05	76.13

WATER YEAR 1990 HIGHEST 74.88 OCT 05, 1989 LOWEST 77.69 NOV 02, 1989

WASHINGTON COUNTY

421829091304701. Local number, 75-06-14 ABBB1.

LOCATION--Lat 41°18'27", long 91°30'47", Hydrologic Unit 07080209, 1 mi north and 1.5 mi east of the junction of U.S. Highway 218 and Iowa Highway 92. Owner: Mrs. David Armstrong.

AQUIFER.--Glacial drift: in material of Pleistocene age.

WELL CHARACTERISTICS.--Bored unused water-table well, diameter 12 in., depth 45 ft, lined with tile.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to barrel, 4.08 ft above land-surface datum.

REMARKS.—None,

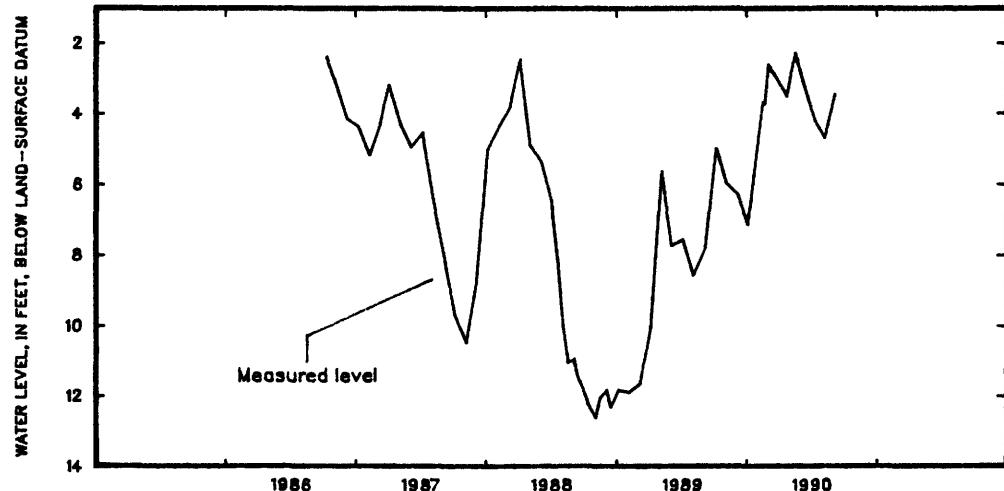
PERIOD OF RECORD.--December 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.53 ft below land-surface datum, May 23, 1984; lowest measured, 12.65 ft below land-surface datum, November 1, 1988.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	5.02	FEB 14	3.72	APR 23	3.55	JUL 09	4.24
NOV 02	6.00	20	3.76	MAY 15	2.32	AUG 06	4.74
DEC 04	6.32	MAR 02	2.65	JUN 07	3.16	SEP 05	3.48
JAN 02	7.17						
WATER YEAR 1990		HIGHEST	2.32	MAY 15, 1990	LOWEST	7.17	JAN 02, 1990

421829091304701



412037091564701. Local number, 76-09-31 CBBC1.

LOCATION--Lat 41°20'37", long 91°56'47", Hydrologic Unit 07080107, at Pepper Quarry on County Road V-15, 1 mi south of the City of Keota. Owner: River Products Co.

AQUIFER.--Mississippian: in limestone of Mississippian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 136 ft, cased to 19 ft, open hole 19-136 ft.

METHOD.--Water-level recorder and chalked tape measurement by USGS personnel.

DATUM. --Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.88 ft above land-surface datum.
REMARKS -Water levels affected by quarrying operations. Recorder removed December 1989.

REMARKS.--Water levels affected by quarrying operations. Recorder removed December 1989.
PERIOD OF RECORD --August, 1979 to current year

PERIOD OF RECORD.--August 1979 to current year.
REVISED RECORDS.--WDB TA-84-1.

REVISED RECORDS: WDR TA-84
EXTREMES FOR PERIOD OF RECORD

DATA FOR PERIOD OF RECORD: highest water level recorded, 9.36 ft below land surface datum, March 4, 1985; lowest recorded, 25.72 ft below land-surface datum, December 10, 1989.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	24.56	NOV 02	25.34	NOV 30	25.64	MAR 02	20.00
10	24.70	05	25.35	DEC 04	25.64	APR 23	15.83
15	24.92	10	25.43	05	25.67	MAY 15	11.90
20	25.05	15	25.48	10	25.72	JUN 07	12.54
25	25.24	20	25.53	JAN 02	23.74	JUL 09	13.84
31	25.32	25	25.55	FEB 21	20.42	AUG 06	14.58

WATER YEAR 1990 HIGHEST 11.90 MAY 15, 1990 LOWEST 25.72 DEC 10, 1989

WASHINGTON COUNTY

412750091495201. Local number 77-09-24 AADAI.

LOCATION.--Lat 41°27'54", long 91°49'47", Hydrologic Unit 07080209, north of the city sewage treatment plant and west of First Avenue SE, Wellman. Owner: City of Wellman.

AQUIFER.--Mississippian: in dolomite of Mississippian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 110 ft, cased to 47 ft, open hole 47 to 110 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 685 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.87 ft above land-surface datum.

REMARKS.--City test well No. 1.

PERIOD OF RECORD.--May 1963 to October 1971, May 1973 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.35 ft above land-surface datum, November 3, 1977, March 28, 1979, and April 13, 1983; lowest measured, 6.80 ft below land-surface datum, October 20, 1964.

REVISION.--Lowest water level measured, 6.80 ft below land-surface datum, October 20, 1964.

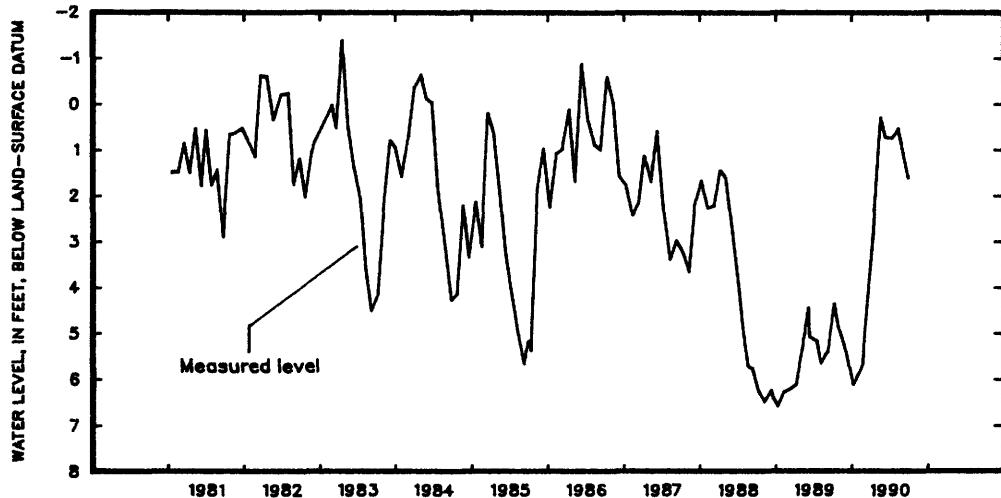
WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
(READINGS ABOVE LAND SURFACE INDICATED BY "+")

DATE	WATER LEVEL						
OCT 05	4.39	JAN 02	6.15	APR 09	2.89	JUL 09	.78
26	4.93	FEB 20	5.69	MAY 15	.33	AUG 06	+.57
NOV 02	5.03	MAR 02	4.97	JUN 07	.77	SEP 25	1.66
DEC 04	5.53						

WATER YEAR 1990 HIGHEST +.57 AUG 06, 1990

LOWEST 6.15 JAN 02, 1990

412750091495201



WEBSTER COUNTY

421550094041001. Local number, 86-28-14 ADAB1.

LOCATION.--Lat 42°15'50", long 94°04'10", Hydrologic Unit 07100004, in the town water plant, next to the water tower, Dayton. Owner: Town of Dayton.

AQUIFER.--Devonian and Mississippian: in limestone of Devonian and Mississippian age.

WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 13 to 10 in., depth 1,240 ft, cased to 505 ft, 8 in. liner 770-966 ft, open hole 505-770 ft and 966-1,240 ft.

METHOD.--Intermittent measurement with airline by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,121 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Pump base, 0.80 ft above land-surface datum.

REMARKS.--Town well No. 2. Water levels affected by pumping.

PERIOD OF RECORD.--September 1942 to December 1948, January 1952 to November 1971, March 1974 to current year.

REVISIONS.--WDR IA-85-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 69.93 ft below land-surface datum, November 17, 1942; lowest measured, 153.20 ft below land-surface datum, February 10, 1987.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
DEC 26	132.20	JUL 17	127.15	SEP 10	100.20	SEP 28	136.29
MAR 21	127.20						

WATER YEAR 1990 HIGHEST 100.20 SEP 10, 1990

LOWEST 136.29 SEP 28, 1990

WEBSTER COUNTY

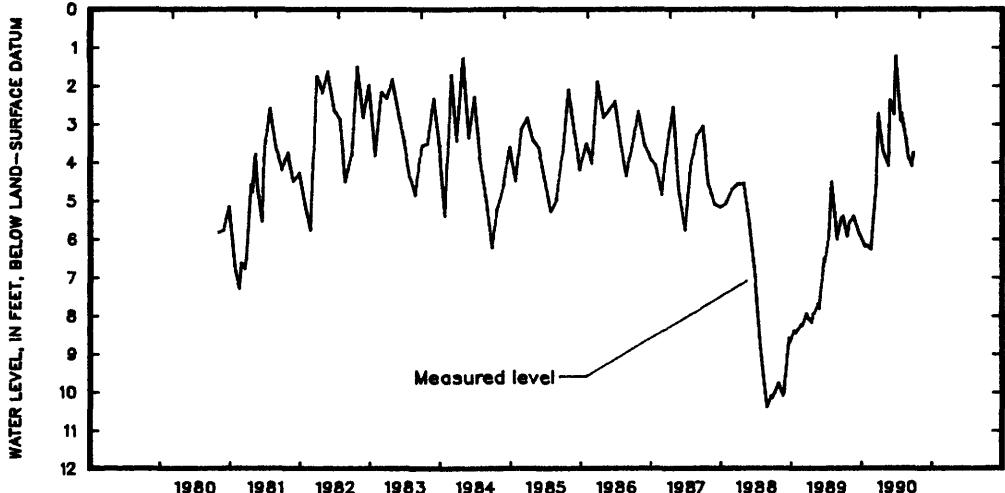
421837094083601. Local number, 87-28-29 CCCD1.
 LOCATION.--Lat 42°18'37", long 94°08'36", Hydrologic Unit 07100006, 3 mi north and 2 mi east of the
 Town of Harcourt. Owner: Grace Helms.
 AQUIFER.--Glacial drift; in material of Pleistocene age.
 WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 12 in., depth 42 ft, lined with tile.
 METHOD.--Twice-a-month measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,165 ft above National Geodetic Vertical Datum of 1929, from
 topographic map. Measuring point: Top of casing, 0.75 ft above land-surface datum.
 REMARKS.--None.
 PERIOD OF RECORD.--October 1942 to June 1956, March 1958 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.05 ft below land-surface datum, August 1,
 1972; lowest measured, 13.62 ft below land-surface datum, March 12, 1956.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	5.97	JAN 11	6.24	APR 14	3.72	JUL 17	2.96
25	5.60	22	6.22	20	3.85	20	2.77
NOV 13	5.45	FEB 13	6.32	MAY 14	4.14	AUG 13	3.44
20	5.58	22	6.36	21	2.42	22	3.89
DEC 11	5.90	MAR 12	4.67	JUN 11	2.79	SEP 13	4.15
21	6.01	21	2.77	22	1.28	21	3.78

WATER YEAR 1990 HIGHEST 1.28 JUN 22, 1990 LOWEST 6.36 FEB 22, 1990

421837094083601



423018094214701. Local number, 89-30-23 CBBB1.
 LOCATION.--Lat 42°30'18", long 94°21'47", Hydrologic Unit 07100004, 75 ft west of the new school
 addition, Barnum. Owner: Johnson Township Consolidated School.
 AQUIFER.--Dakota; in sandstone of Cretaceous age.
 WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 4 in., reported depth 208 ft, cased
 to 208 ft, perforated 203-208 ft.
 METHOD.--Quarterly measurement with chalked tape by USGS personnel.
 DATUM.--Elevation of land-surface datum is 1,174 ft above National Geodetic Vertical Datum of 1929, from
 topographic map. Measuring point: Top of casing at land-surface datum.
 REMARKS.--None.
 PERIOD OF RECORD.--October 1942 to September 1945, May 1947 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 30.36 ft below land-surface datum, October
 21, 1942; lowest measured, 45.85 ft below land-surface datum, July 28, 1980.
 REVISIONS.--Highest water level measured, 30.36 ft below land-surface datum, October 21, 1942; lowest
 measured, 45.85 ft below land-surface datum, July 28, 1980.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL						
NOV 16	44.17	MAR 30	44.39	JUN 11	44.48	SEP 18	43.00

WATER YEAR 1990 HIGHEST 43.00 SEP 18, 1990 LOWEST 44.48 JUN 11, 1990

WOODBURY COUNTY

422058095573701. Local number, 87-44-15 CBBB1.

LOCATION.--Lat 42°20'58", long 95°57'37", Hydrologic Unit 10230003, approximately 3.5 mi west and 5.5 mi north of the Village of Oto. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 197 ft, cased to 197 ft, perforated 185-189 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,165 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.50 ft above land-surface datum.

REMARKS.--Well D-34.

PERIOD OF RECORD.--April 1980 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 54.21 ft below land-surface datum, January 11, 1988; lowest measured, 63.56 ft below land-surface datum, November 2, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	59.34	JAN 11	59.88	APR 10	59.50	JUL 11	59.51
WATER YEAR 1990		HIGHEST	59.34	OCT 04, 1989		LOWEST	59.88
							JAN 11, 1990

422830096000511. Local number, 88-44-16 BAAAB1.

LOCATION.--Lat 42°28'30", long 96°00'05", Hydrologic Unit 10230004, approximately 3 mi east and 0.5 mi south of the Town of Moville. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 337 ft, cased to 337 ft, perforated 332-337 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,340 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.50 ft above land-surface datum.

REMARKS.--Well D-33.

PERIOD OF RECORD.--October 1979 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 199.09 ft below land-surface datum, April 13, 1987; lowest measured, 202.90 ft below land-surface datum, October 17, 1979.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	200.74	JAN 10	200.48	APR 10	202.00	JUL 11	200.84
WATER YEAR 1990		HIGHEST	200.48	JAN 10, 1990		LOWEST	202.00
							APR 10, 1990

423015096034601. Local number, 89-44-20 DCDC1.

LOCATION.--Lat 42°30'15", long 96°03'46", Hydrologic Unit 10230004, east of Iowa Highway 140, approximately 1 mi north of the Town of Moville. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 221 ft, cased to 221 ft, perforated 206-221 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,168 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.

REMARKS.--Well D-32.

PERIOD OF RECORD.--October 1979 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.64 ft below land-surface datum, August 8, 1984; lowest measured, 26.65 ft below land-surface datum, December 11, 1980.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	26.40	JAN 10	26.46	APR 10	26.10	JUL 11	25.73
WATER YEAR 1990		HIGHEST	25.73	JUL 11, 1990		LOWEST	26.46
							JAN 10, 1990

WOODBURY COUNTY

422910096135811. Local number, 89-46-36 BBDC11.

LOCATION.--Lat $42^{\circ}29'10''$, long $96^{\circ}13'58''$, Hydrologic Unit 10230004, approximately 0.75 mi northeast of the Eberly Cemetery or 2.5 mi west and 0.75 mi north of the Village of Lawton. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota; in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 500 ft, cased to 500 ft, perforated 358-362 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,268 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.00 ft above land-surface datum.

REMARKS.--Well D-30.

PERIOD OF RECORD.--April 1980 to December 1980, May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 128.32 ft below land-surface datum, July 8, 1987; lowest measured, 135.35 ft below land-surface datum, November 2, 1982.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	131.80	JAN 10	131.89	APR 10	134.00	JUL 11	130.64
WATER YEAR 1990		HIGHEST	130.64	JUL 11, 1990		LOWEST	134.00 APR 10, 1990

GROUND-WATER-QUALITY DATA

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DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN) (72004)	TEMPERATURE (DEG C) (00010)	CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	HARDNESS (MG/L) (CACO3) (00900)	CALCIUM AS (MG/L) (00900)	MAGNESIUM, DISOLVED (MG/L) (AS CA) (00915)	SODIUM, DISOLVED (MG/L) (AS MG) (00925)
ADAIR COUNTY											
OCT 1989 04...	1600	111ALVM	12		20	13.0	478	--	--	--	--
412852094275101 07731W07CAAB					1977MENLO 3	(LAT 41 28 52N LONG 094 27 51W)					
AUG 1990 14...	1445	111HLCN	35		20	11.0	285	6.4	--	--	--
411246094402401 07533W32CDBB					1967BRIDGEWATER 2	(LAT 41 12 46N LONG 094 40 24W)					
AUG 1990 14...	1600	111ALVM	75		20	11.0	558	6.6	--	--	--
411727094374001 07533W15DDBB					1976FONTANELLE 5	(LAT 41 17 27N LONG 094 37 40W)					
AUG 1990 14...	0950	371JRDN	260		130	10.0	560	7.5	290	80	22
431638091282801 09805W30ACD					ALLAMAKEE COUNTY	08170 1957WAUKON 4	(LAT 43 16 38N LONG 091 28 28W)				
AUG 1990 24...	1500	111ENRV	55		20	10.0	610	7.5	300	86	20
414216094532301 08035W26CDDA					AUDUBON COUNTY	1977AUDUBON 19	(LAT 41 42 16N LONG 094 53 23W)				
AUG 1990 14...	1610	111ALVM	50		20	12.0	850	7.2	400	110	31
413731095042201 07936W30ADDA					1948KIMBALLTON 1	(LAT 41 37 31N LONG 095 04 22W)					
AUG 1990 14...	0755	111ALVM	50		20	12.0	700	7.6	400	110	30
413534094532501 07835W04BCBD					1964EXIRA 10	(LAT 41 35 34N LONG 094 53 25W)					
AUG 1990 15...	0845	111ENRV	50		20	15.0	860	7.2	--	--	--
423042092265801 08914W24BBAA					BLACK HAWK COUNTY	1961CEDAR FALLS 5	(LAT 42 30 42N LONG 092 26 58W)				
OCT 1989 05...	0830	344CDVL	2350		30	12.0	570	7.2	--	--	--
423045092283401 08914W22AAAA					1971CEDAR FALLS 8	(LAT 42 30 45N LONG 092 28 34W)					
AUG 1990 03...	0800	344CDVL	2100		20	11.0	430	7.2	260	74	19
423112092213901 08913W15DABB					1937WATERLOO 10	(LAT 42 31 12N LONG 092 21 39W)					
AUG 1990 03...	1045	111ALVM	1910		90	12.0	530	7.2	--	--	--
423200092224001 08913W09DA					08641 1957WATERLOO 16	(LAT 42 32 00N LONG 092 22 40W)					
AUG 1990 03...	1130	355NIGR	3160		20	12.5	520	7.2	310	89	22
422805092165901 08812W06ACAA					10039 1958EVANSDALE 3	(LAT 42 28 05N LONG 092 16 59W)					
AUG 1990 03...	1330	344WPPC	300		15	13.0	600	7.1	--	--	--

GROUND-WATER-QUALITY DATA

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (MG/L AS 70300) (00631)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
ADAIR COUNTY										
	412852094275101	07731W07CAAB				1977MENLO 3	(LAT 41 28 52N LONG 094 27 51W)			
OCT 1989 04...	--	--	--	--	--	--	--	--	2.10	<0.100
	411246094402401	07533W32CDBB				1967BRIDGEWATER 2	(LAT 41 12 46N LONG 094 40 24W)			
AUG 1990 14...	--	--	--	--	--	--	--	--	8.50	<0.100
	411727094374001	07533W15DDBB				1976FONTANELLE 5	(LAT 41 17 27N LONG 094 37 40W)			
AUG 1990 14...	--	--	--	--	--	--	--	--	0.100	0.700
ALLAMAKEE COUNTY										
	431638091282801	09805W30ACD			08170 1957WAUKON 4	(LAT 43 16 38N LONG 091 28 28W)				
AUG 1990 24...	2.0	<1.0	257		2.0	19	0.10	12	296	0.600
	414216094532301	08035W26CDDA			AUDUBON COUNTY					
					1977AUDUBON 19	(LAT 41 42 16N LONG 094 53 23W)				
AUG 1990 14...	7.5	<1.0	201		18	71	0.20	18	326	<0.100
	413731095042201	07936W30ADDA			1948KIMBALLTON 1					
					(LAT 41 37 31N LONG 095 04 22W)					
AUG 1990 14...	17	1.5	259		81	82	0.40	27	472	<0.100
	413534094532501	07835W04BCBD			1964EXIRA 10					
					(LAT 41 35 34N LONG 094 53 25W)					
AUG 1990 15...	16	3.3	220		46	140	0.45	18	488	<0.100
	413234094552401	07835W19BCDB			1976BRAYTON 1					
					(LAT 41 32 34N LONG 094 55 24W)					
AUG 1990 15...	--	--	--	--	--	--	--	--	--	<0.100
BLACK HAWK COUNTY										
	423042092265801	08914W24BBAA			1961CEDAR FALLS 5	(LAT 42 30 42N LONG 092 26 58W)				
OCT 1989 05...	--	--	--	--	--	--	--	--	3.20	<0.100
	423045092283401	08914W22AAAA			1971CEDAR FALLS 8					
					(LAT 42 30 45N LONG 092 28 34W)					
AUG 1990 03...	4.8	1.0	228		2.0	13	0.65	12	214	<0.100
	423112092213901	08913W15DABB			1937WATERLOO 10					
					(LAT 42 31 12N LONG 092 21 39W)					
AUG 1990 03...	--	--	--	--	--	--	--	--	5.00	<0.100
	423200092224001	08913W09DA			08641 1957WATERLOO 16	(LAT 42 32 00N LONG 092 22 40W)				
AUG 1990 03...	4.9	<1.0	210		25	22	0.15	14	264	7.10
	422805092165901	08812W06ACAA			10039 1958EVANSDALE 3	(LAT 42 28 05N LONG 092 16 59W)				
AUG 1990 03...	--	--	--	--	--	--	--	--	<0.100	0.200

GROUND-WATER-QUALITY DATA

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DATE	PHOS-PHORUS		MANGANESE		METRABUZIN		METOLACHLOR		TRIFLURALIN	
	ORTHO, DIS-SOLVED (MG/L AS P)	IRON, DIS-SOLVED (UG/L AS FE)	NESE. DIS-SOLVED (UG/L AS MN)	ATRA-ZINE (UG/L) (UG/L)	CYAN-AZINE (UG/L) (UG/L)	TOTAL (UG/L)	WHOLE (UG/L)	TOTAL (UG/L)	WATER RECOVER (UG/L)	WHOLE WATER (UG/L)
(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	(99901)	(39030)	[Pesticide concentration expressed as total recoverable]

412852094275101 07731W07CAAB ADAIR COUNTY
1977MENLO 3 (LAT 41 28 52N LONG 094 27 51W)

OCT 1989 04... 0.200 -- -- 0.10 0.10 <0.10 <0.10 <0.10 -- <0.10

411246094402401 07533W32CDBB 1967 BRIDGEWATER 2 (LAT 41 12 46N LONG 094 40 24W)

AUG 1990 14... 0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

411727094374001 07533W15DDBB 1976FONTANELLE 5 (LAT 41 17 27N LONG 094 37 40W)

AUG 1990 <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

431638001282801 00805W30ACB ALLAMAKEE COUNTY 08130-10514A1K0N-461 LAT 43.16 38N LONG 081.28 38W1

AUG 1990

AUDUBON COUNTY
1977AUDUBON 19 (LAT 41 42 16N LONG 094 53 23W)

413731095042201 07936W30ADDA 1948KIMBALLTON 1 (LAT 41 37 31N LONG 095 04 22W)

AUG 1990 14... <0.100 13000 1800 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

413534094532501 07835W04BCBD 1964EXIRA 10 (LAT 41 35 34N LONG 094 53 25W)

AUG 1990
15... <0.100 6600 1800 -- -- -- -- -- -- --

413234094552401 07835W19BCDB 1976BRAYTON 1 (LAT 41 32 34N LONG 094 55 24W

AUG 1990 15... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

423042092265801 08914W24BBAA 1961CEDAR FALLS 5 (LAT 42 30 42N LONG 092 26 58W

OCT 1989 <0.100 -- -- <0.20 <0.10 <0.10 <0.10 <0.10 -- <0.10

423045092283401 08914W22AAAAA 1971CEDAR FALLS 8 (LAT 42 30 45N LONG 092 28 34W)

423112092213901 08913W15DABB 1937WATERLOO 10 (LAT 42 31 12N LONG 092 21 39W)

AUG 1990
03... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

42320002224001 08613W00PA 08641 1057WATERLOO_16 (LAT 43-32-00N LONG 082-22-46W)

AUG 1990 ≤ 0 100 ≤ 20 ≤ 20 ≤ 0 10 ≤ 0 10 ≤ 0 10 ≤ 0 10 ≤ 0 10

422805092165901 08812W06ACAA 10039 1958EVANSDALE 3 (LAT 42 28 05N LONG 092 16 59W)

GROUND-WATER-QUALITY DATA

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING		SPECIFIC CONDUCTANCE	PH (STAND-ARD UNITS)	HARDNESS TOTAL (MG/L) (00900)	CALCIUM AS CACO ₃ (MG/L) (00915)	MAGNESIUM, DIS-SOLVED (MG/L) (00925)	
				TEMPERATURE (MIN) (DEG C) (72004)	WATER (US/CM) (00010)	DUCT-ANCE (00095)					
				BLACK HAWK COUNTY 421903092112601 08712W25DBBC 23018 1972LA PORTE CITY 4 (LAT 42 19 03N LONG 092 11 26W)							
AUG 1990 03...	1500	3600VVCB	486	--	15.0	790	7.1	--	--	--	
				BOONE COUNTY 420156093562401 08327W01ABCC 1956OGDEN 3 (LAT 42 01 56N LONG 093 56 24W)							
AUG 1990 07...	1530	111ALVM	290	15	12.5	790	7.1	--	--	--	
				1979BOONE 23 (LAT 42 04 47N LONG 093 56 07W)							
AUG 1990 13...	1520	111ALVM	280	20	15.0	760	7.0	--	--	--	
				BREMER COUNTY 423902092272502 09114W35DA 1984JANESVILLE 3 (LAT 42 39 02N LONG 092 27 25W)							
OCT 1989 05...	1000	350SLRN	200	30	11.5	445	7.4	--	--	--	
AUG 1990 02...	1530	350SLRN	100	15	13.5	505	7.2	--	--	--	
				424319092283401 09114W03CABB 1967WAVERLY 5 (LAT 42 43 19N LONG 092 28 34W)							
OCT 1989 05...	1045	340DVSL	1600	30	12.0	610	7.4	--	--	--	
				425037092320601 09314W30ADAA 1969PLAINFIELD 2 (LAT 42 50 37N LONG 092 32 06W)							
JUL 1990 24...	1500	340DVNN	175	90	12.0	490	7.3	240	67	17	
				424007092194001 09113W25BADA 20380 1968DENVER 3 (LAT 42 40 07N LONG 092 19 40W)							
AUG 1990 03...	0900	358KNKK	200	--	11.0	590	7.2	370	110	23	
				BUCHANAN COUNTY 423710091540001 09009W10CBA 06208 1953HAZLETON 1 (LAT 42 37 10N LONG 091 54 00W)							
OCT 1989 06...	1325	350SLRN	150	10	11.0	515	7.5	--	--	--	
				422742091534801 08809W04DBA 16147 1964INDEPENDENCE 6 (LAT 42 27 42N LONG 091 53 48W)							
AUG 1990 22...	0945	350SLRN	600	10	11.0	530	7.7	--	--	--	
				422810092035201 08910W31DDCA 1976JESUP 3 (LAT 42 28 10N LONG 092 03 52W)							
AUG 1990 29...	1005	340DVSL	280	30	10.5	560	7.3	250	61	24	
				BUENA VISTA COUNTY 423803095143601 09037W05ADCD 1972STORM LAKE 11 (LAT 42 38 03N LONG 095 14 36W)							
JUL 1990 27...	1430	112PLSC	550	15	12.5	770	7.0	--	--	--	
				425344095090401 09337W01DDDD 1977SIOUX RAPIDS 2 (LAT 42 53 44N LONG 095 09 04W)							
JUL 1990 30...	1330	111ALVM	286	30	12.0	835	7.0	--	--	--	
				BUTLER COUNTY 424455092581801 09218W28DBDD 1925DUMONT 1 (LAT 42 44 55N LONG 092 58 18W)							
JUL 1990 24...	1615	340DVNN	130	15	13.0	540	7.3	--	--	--	

GROUND-WATER-QUALITY DATA

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DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (MG/L SIO2) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
------	---	--	--	--	--	---	--	---	--	--

BLACK HAWK COUNTY
421903092112601 08712W25DBBC 23018 1972LA PORTE CITY 4 (LAT 42 19 03N LONG 092 11 26W)

AUG 1990
03... -- -- -- -- -- -- -- -- <0.100 0.500

BOONE COUNTY
420156093562401 08327W01ABCC 1956OGDEN 3 (LAT 42 01 56N LONG 093 56 24W)

AUG 1990
07... -- -- -- -- -- -- -- -- 1.50 <0.100

1979BOONE 23 (LAT 42 04 47N LONG 093 56 07W)

AUG 1990
13... -- -- -- -- -- -- -- -- 6.00 <0.100

BREMER COUNTY
423902092272502 09114W35DA 1984JANESVILLE 3 (LAT 42 39 02N LONG 092 27 25W)

OCT 1989
05... -- -- -- -- -- -- -- -- 8.90 <0.100

AUG 1990
02... -- -- -- -- -- -- -- -- 8.10 <0.100

1967WAVERLY 5 (LAT 42 43 19N LONG 092 28 34W)

OCT 1989
05... -- -- -- -- -- -- -- -- 6.50 <0.100

1969PLAINFIELD 2 (LAT 42 50 37N LONG 092 32 06W)

JUL 1990
24... 5.5 1.0 164 16 28 -- 13 252 5.60 <0.100

20380 1968DENVER 3 (LAT 42 40 07N LONG 092 19 40W)

AUG 1990
03... 8.7 <1.0 268 17 40 0.20 13 304 0.600 <0.100

BUCHANAN COUNTY
423710091540001 09009W10CBA 06208 1953HAZLETON 1 (LAT 42 37 10N LONG 091 54 00W)

OCT 1989
06... -- -- -- -- -- -- -- -- 9.60 <0.100

16147 1964INDEPENDENCE 6 (LAT 42 27 42N LONG 091 53 48W)

AUG 1990
22... -- -- -- -- -- -- -- -- <0.100 0.180

422810092035201 08910W31DDCA 1976JESUP 3 (LAT 42 28 10N LONG 092 03 52W)

AUG 1990
29... 4.2 1.3 260 2.2 12 0.45 12 260 <0.100 <0.100

BUENA VISTA COUNTY
423803095143601 09037W05ADCD 1972STORM LAKE 11 (LAT 42 38 03N LONG 095 14 36W)

JUL 1990
27... -- -- -- -- -- -- -- -- -- -- -- --

1977SIOUX RAPIDS 2 (LAT 42 53 44N LONG 095 09 04W)

JUL 1990
30... -- -- -- -- -- -- -- -- -- 5.40 <0.100

424455092581801 09218W28DBBD 1925DUMONT 1 (LAT 42 44 55N LONG 092 58 18W)

JUL 1990
24... -- -- -- -- -- -- -- -- -- <0.100 0.700

GROUND-WATER-QUALITY DATA

DATE	PHOS-	IRON,	MANGA-	METRI-			METOLA-		TRI-	
	PHORUS	DIS-	NESE,	BUZIN	ALA-	CHLOR	IN	CHLOR	LIN	
	ORTHO,	DIS-	DIS-	CYAN-	IN	CHLOR	IN	BUTY-	TOTAL	
	SOLVED	SOLVED	SOLVED	ZINE,	WHOLE	TOTAL	WHOLE	LATE	RECOVER	
	(MG/L)	(UG/L)	(UG/L)	TOTAL	WATER	RECOVER	WATER	(UG/L)	(UG/L)	
	AS P)	AS FE)	AS MN)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	
	[Pesticide concentration expressed as total recoverable]									
	(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	(99901)	(39030)

BLACK HAWK COUNTY
421903092112601 08712W25DBBC 23018 1972LA FORTE CITY 4 (LAT 42 19 03N LONG 092 11 26W)

AUG 1990 03... <0.100 -- -- -- -- -- -- -- -- -- -- --

BOONE COUNTY
420156093562401 08327W01ABCC 1956OGDEN 3 (LAT 42 01 56N LONG 093 56 24W)

AUG 1990 07... 0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

1979BOONE 23 (LAT 42 04 47N LONG 093 56 07W)
420447093560701 08427W13DDBC

AUG 1990 13... 0.100 -- -- 0.20 <0.10 <0.10 <0.10 <0.20 <0.10 <0.10

BREMER COUNTY
423902092272502 09114W35DA 1984JANESVILLE 3 (LAT 42 39 02N LONG 092 27 25W)

OCT 1989 05... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 -- <0.10
AUG 1990 02... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

1967WAVERLY 5 (LAT 42 43 19N LONG 092 28 34W)
424319092283401 09114W03CABB

OCT 1989 05... <0.100 -- -- 0.16 <0.10 <0.10 <0.10 <0.10 -- <0.10

1969PLAINFIELD 2 (LAT 42 50 37N LONG 092 32 06W)
425037092320601 09314W30ADAA

JUL 1990 24... <0.100 <20 <20 0.16 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

20380 1968DENVER 3 (LAT 42 40 07N LONG 092 19 40W)
424007092194001 09113W25BADA

AUG 1990 03... <0.100 80 30 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

BUCHANAN COUNTY
423710091540001 09009W10CBA 06208 1953HAZLETON 1 (LAT 42 37 10N LONG 091 54 00W)

OCT 1989 06... <0.100 -- -- 0.49 <0.10 <0.10 <0.10 <0.10 -- <0.10

16147 1964INDEPENDENCE 6 (LAT 42 27 42N LONG 091 53 48W)
422742091534801 08809W04DBA

AUG 1990 22... <0.010 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

1976JESUP 3 (LAT 42 28 10N LONG 092 03 52W)
422810092035201 08910W31DDCA

AUG 1990 29... <0.100 40 30 -- -- -- -- -- -- -- --

BUENA VISTA COUNTY
423803095143601 09037W05ADCD 1972STORM LAKE 11 (LAT 42 38 03N LONG 095 14 36W)

JUL 1990 27... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

1977SIOUX RAPIDS 2 (LAT 42 53 44N LONG 095 09 04W)
425344095090401 09337W01DDDD

JUL 1990 30... <0.100 -- -- 1.0 0.15 0.35 <0.10 2.40 <0.10 <0.10

1925DUMONT 1 (LAT 42 44 55N LONG 092 58 18W)
424455092581801 09218W28DBDD

JUL 1990 24... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

GROUND-WATER-QUALITY DATA

361

DATE	GROSS ALPHA, DIS- SOLVED (PCI/L U-NAT) (01515)	GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515)	RADIUM 226, DIS- SOLVED (PCI/L (09503)
	AS	AS	SOLVED

BLACK HAWK COUNTY
 421903092112601 08712W25DBBC 23018 1972LA PORTE CITY 4 (LAT 42 19 03N LONG 092 11 26W)

AUG 1990
 03... 9.6 18 3.7

BOONE COUNTY
 420156093562401 08327W01ABCC 1956OGDEN 3 (LAT 42 01 56N LONG 093 56 24W)

AUG 1990
 07... -- -- --

420447093560701 08427W13DDBC 1979BOONE 23 (LAT 42 04 47N LONG 093 56 07W)

AUG 1990
 13... -- -- --

BREMER COUNTY
 423902092272502 09114W35DA 1984JANESVILLE 3 (LAT 42 39 02N LONG 092 27 25W)

OCT 1989
 05... -- -- --
 AUG 1990
 02... -- -- --

424319092283401 09114W03CABB 1967WAVERLY 5 (LAT 42 43 19N LONG 092 28 34W)

OCT 1989
 05... -- -- --

425037092320601 09314W30ADAA 1969PLAINFIELD 2 (LAT 42 50 37N LONG 092 32 06W)

JUL 1990
 24... -- -- --

424007092194001 09113W25BADA 20380 1968DENVER 3 (LAT 42 40 07N LONG 092 19 40W)

AUG 1990
 03... -- -- --

BUCHANAN COUNTY
 423710091540001 09009W10CBA 06208 1953HAZLETON 1 (LAT 42 37 10N LONG 091 54 00W)

OCT 1989
 06... -- -- --

422742091534801 08809W04DBA 16147 1964INDEPENDENCE 6 (LAT 42 27 42N LONG 091 53 48W)

AUG 1990
 22... -- -- --

422810092035201 08910W31DDCA 1976JESUP 3 (LAT 42 28 10N LONG 092 03 52W)

AUG 1990
 29... 2.1 <2.2 1.3

BUENA VISTA COUNTY
 423803095143601 09037W05ADCD 1972STORM LAKE 11 (LAT 42 38 03N LONG 095 14 36W)

JUL 1990
 27... -- -- --

425344095090401 09337W01DDDD 1977SIOUX RAPIDS 2 (LAT 42 53 44N LONG 095 09 04W)

JUL 1990
 30... -- -- --

BUTLER COUNTY
 424455092581801 09218W28DBDD 1925DUMONT 1 (LAT 42 44 55N LONG 092 58 18W)

JUL 1990
 24... -- -- --

GROUND-WATER-QUALITY DATA

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN)		TEMPER- ATURE WATER (DEG C) (00010)	CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD (00400)	HARD- NESS TOTAL (MG/L) (00900)	CALCIUM AS CACO3 (00900)	MAGNE- SIUM, DIS- SOLVED (MG/L) (00915)	
				BUTLER COUNTY								
423436092471601 09016W30CBAC				1935SPARKERSBURG 1 (LAT 42 34 36N LONG 092 47 16W)								
AUG 1990 02...	1230	344CDVL	335		30	13.0	440	7.3	270	75	19	
				423401092373601 09015W33BCA								07854 1956NEW HARTFORD 2 (LAT 42 34 01N LONG 092 37 36W)
AUG 1990 02...	1400	344CLVL	200		90	12.5	460	7.2	--	--	--	
				420733094465301 08534W35CCCB								08006 1956CLIDDERDALE 2 (LAT 42 07 33N LONG 094 46 53W)
AUG 1990 01...	1500	217DKOT	25		15	13.5	640	7.1	--	--	--	
				415808094491901 08334W28CBCC								1965WILLEY 2 (LAT 41 58 08N LONG 094 49 19W)
AUG 1990 01...	1600	111ALVM	--		--	14.0	620	7.1	340	100	23	
				415435094492801 08234W17DDBA								21882 1969DEDHAM 4 (LAT 41 54 35N LONG 094 49 28W)
AUG 1990 01...	1710	111SRRV	60		15	13.0	525	7.5	--	--	--	
				420024094575903 08335W18BAAD								1952HALBUR 3 (LAT 42 00 24N LONG 094 57 59W)
AUG 1990 14...	1135	111ALVM	12		20	15.0	710	7.3	420	110	35	
				415442095040301 08236W17CACB								1978MANNING 9 (LAT 41 54 42N LONG 095 04 03W)
AUG 1990 14...	1330	111ALVM	80		20	13.0	750	7.2	430	120	32	
				411502094471401 07534W32CAAA								CASS COUNTY 1979MASSENA 79-2 (LAT 41 15 02N LONG 094 47 14W)
AUG 1990 14...	1330	111ALVM	40		20	11.0	551	6.7	--	--	--	
				414026091210602 07904W06DDBB								CEDAR COUNTY 20575 1968WEST BRANCH 3 (LAT 41 40 26N LONG 091 21 06W)
JUL 1990 20...	1320	358ALXD	170		15	12.0	945	7.2	490	130	41	
				415418091153401 08204W13DCB								13609 1962MECHANICSVILLE 2 (LAT 41 54 18N LONG 091 15 34W)
AUG 1990 30...	1000	350SLRN	325		20	12.5	448	7.8	230	47	27	
				415311091035301 08202W27BADA								1977CLARENCE 3 (LAT 41 53 11N LONG 091 03 53W)
AUG 1990 30...	1100	361ODVCU	210		120	12.5	482	7.5	240	60	21	
				431426093073301 09719W06DD								CERRO GORDO COUNTY 1925PLYMOUTH 1 (LAT 43 14 26N LONG 093 07 33W)
JUL 1990 23...	1400	344CDVL	110		15	13.0	540	7.0	--	--	--	
				424341095331301 09140W03ACCC								18613 1966CHEROKEE 7 (LAT 42 43 41N LONG 095 33 13W)
JUL 1990 18...	1240	217DKOT	600		20	13.0	970	7.3	520	140	41	

GROUND-WATER-QUALITY DATA

363

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 (MG/L (70300))	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	
BUTLER COUNTY											
AUG 1990 02...	423436092471601	09016W30CBAC		1935PARKERSBURG	1	(LAT 42 34 36N LONG 092 47 16W)					
CARROLL COUNTY											
AUG 1990 02...	423401092373601	09015W33BCA	07854	1956NEW HARTFORD	2	(LAT 42 34 01N LONG 092 37 36W)					
AUG 1990 01...	420733094465301	08534W35CCCCB	08006	1956LIDDERDALE	2	(LAT 42 07 33N LONG 094 46 53W)					
CASS COUNTY											
AUG 1990 01...	415808094491901	08334W28CBCC		1965WILLEY	2	(LAT 41 58 08N LONG 094 49 19W)					
AUG 1990 01...	415435094492801	08234W17DDBA	21882	1969DEDHAM	4	(LAT 41 54 35N LONG 094 49 28W)					
AUG 1990 01...	420024094575803	08335W18BAAD		1952HALBUR	3	(LAT 42 00 24N LONG 094 57 59W)					
AUG 1990 14...	415442095040301	08236W17CACB		1978MANNING	9	(LAT 41 54 42N LONG 095 04 03W)					
AUG 1990 14...	411502094471401	07534W32CAAA		1979MASSENA	79-2	(LAT 41 15 02N LONG 094 47 14W)					
AUG 1990 14...	414026091210602	07904W06DDBB	20575	1968WEST BRANCH	3	(LAT 41 40 26N LONG 091 21 06W)					
JUL 1990 20...	415418091153401	08204W13DCB	13609	1962MECHANICSVILLE	2	(LAT 41 54 18N LONG 091 15 34W)					
AUG 1990 30...	415311091035301	08202W27BADA		1977CLARENCE	3	(LAT 41 53 11N LONG 091 03 53W)					
AUG 1990 30...	431426093073301	09719W06DD		CERRO GORDO COUNTY		1925PLYMOUTH 1 (LAT 43 14 26N LONG 093 07 33W)					
JUL 1990 23...	424341095331301	09140W03ACCC	18613	CHEROKEE COUNTY		1966CHEROKEE 7 (LAT 42 43 41N LONG 095 33 13W)					
JUL 1990 18...	38	5.1	254	2.0	--	0.65	28	720	0.100	0.400	

GROUND-WATER-QUALITY DATA

DATE	PHOS-	PHORUS	IRON,	MANGA-	METRI-			METOLA-	TRI-		
	ORTHO,	DIS-	DIS-	ZINE,	CYAN-	BUZIN	ALA-	CHLOR	IN	FLURA-	
	SOLVED	SOLVED	SOLVED	TOTAL	AZINE	WHOLE	TOTAL	WHOLE	BUTY-	LIN	
(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	WATER	RECOVER	WATER	LATE	TOTAL	
AS P)	AS FE)	AS MN)	(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	(99901)
					[Pesticide concentration expressed as total recoverable]						

BUTLER COUNTY
423436092471601 09016W30CBAC 1935PARKERSBURG 1 (LAT 42 34 36N LONG 092 47 16W)

AUG 1990
02... <0.100 380 40 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

423401092373601 09015W33BCA 07854 1956NEW HARTFORD 2 (LAT 42 34 01N LONG 092 37 36W)

AUG 1990
02... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

CARROLL COUNTY
420733094465301 08534W35CCCB 08006 1956LIDDERDALE 2 (LAT 42 07 33N LONG 094 46 53W)

AUG 1990
01... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

415808094491901 08334W28CBCC 1965WILLEY 2 (LAT 41 58 08N LONG 094 49 19W)

AUG 1990
01... <0.100 4000 290 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

415435094492801 08234W17DDBA 21882 1969DEDHAM 4 (LAT 41 54 35N LONG 094 49 28W)

AUG 1990
01... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

420024094575903 08335W18BAAD 1952HALBUR 3 (LAT 42 00 24N LONG 094 57 59W)

AUG 1990
14... <0.100 <20 <20 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

415442095040301 08236W17CACB 1978MANNING 9 (LAT 41 54 42N LONG 095 04 03W)

AUG 1990
14... <0.100 <20 210 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

CASS COUNTY
411502094471401 07534W32CAAA 1979MASSENA 79-2 (LAT 41 15 02N LONG 094 47 14W)

AUG 1990
14... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

CEDAR COUNTY
414026091210602 07904W06DDBB 20575 1968WEST BRANCH 3 (LAT 41 40 26N LONG 091 21 06W)

JUL 1990
20... <0.100 410 80 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

415418091153401 08204W13DCB 13609 1962MECHANICSVILLE 2 (LAT 41 54 18N LONG 091 15 34W)

AUG 1990
30... <0.100 210 40 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

415311091035301 08202W27BADA 1977CLARENCE 3 (LAT 41 53 11N LONG 091 03 53W)

AUG 1990
30... <0.100 900 30 -- -- -- -- -- -- -- --

CERRO GORDO COUNTY
431426093073301 09719W06DDD 1925PLYMOUTH 1 (LAT 43 14 26N LONG 093 07 33W)

JUL 1990
23... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

CHEROKEE COUNTY
424341095331301 09140W03ACCC 18613 1966CHEROKEE 7 (LAT 42 43 41N LONG 095 33 13W)

JUL 1990
18... <0.100 910 340 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

GROUND-WATER-QUALITY DATA

365

DATE	GROSS	GROSS	RADIUM
	ALPHA,	BETA,	
	DIS-	DIS-	
	SOLVED	SOLVED	226,
	(PCI/L	(PCI/L	DIS-
	AS	AS	SOLVED
	U-NAT)	CS-137)	(PCI/L)
	(01515)	(03515)	(09503)

BUTLER COUNTY
423436092471601 09016W30CBAC 1935PARKERSBURG 1 (LAT 42 34 36N LONG 092 47 16W)

AUG 1990
02... -- -- --

423401092373601 09015W33BCA 07854 1956NEW HARTFORD 2 (LAT 42 34 01N LONG 092 37 36W)

AUG 1990
02... -- -- --

CARROLL COUNTY
420733094465301 08534W35CCCCB 08006 1956LIDDERDALE 2 (LAT 42 07 33N LONG 094 46 53W)

AUG 1990
01... -- -- --

415808094491901 08334W28CBCC 1965WILLEY 2 (LAT 41 58 08N LONG 094 49 19W)

AUG 1990
01... -- -- --

415435094492801 08234W17DDBA 21882 1969DEDHAM 4 (LAT 41 54 35N LONG 094 49 28W)

AUG 1990
01... -- -- --

420024094575903 08335W18BAAD 1952HALBUR 3 (LAT 42 00 24N LONG 094 57 59W)

AUG 1990
14... -- -- --

415442095040301 08236W17CACB 1978MANNING 9 (LAT 41 54 42N LONG 095 04 03W)

AUG 1990
14... -- -- --

CASS COUNTY
411502094471401 07534W32CAAA 1979MASSENA 79-2 (LAT 41 15 02N LONG 094 47 14W)

AUG 1990
14... -- -- --

CEDAR COUNTY
414026091210602 07904W06DDBB 20575 1968WEST BRANCH 3 (LAT 41 40 26N LONG 091 21 06W)

JUL 1990
20... -- -- --

415418091153401 08204W13DCB 13609 1962MECHANICSVILLE 2 (LAT 41 54 18N LONG 091 15 34W)

AUG 1990
30... -- -- --

415311091035301 08202W27BADA 1977CLARENCE 3 (LAT 41 53 11N LONG 091 03 53W)

AUG 1990
30... 2.2 <2.5 1.9

CERRO GORDO COUNTY
431426093073301 09719W06DD 1925PLYMOUTH 1 (LAT 43 14 26N LONG 093 07 33W)

JUL 1990
23... -- -- --

CHEROKEE COUNTY
424341095331301 09140W03ACCC 18613 1966CHEROKEE 7 (LAT 42 43 41N LONG 095 33 13W)

JUL 1990
18... -- -- --

GROUND-WATER-QUALITY DATA

GROUND-WATER-QUALITY DATA

367

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDs, RESIDUE AT 180 DEG. C (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
------	---	--	--	--	--	---	--	---	--	--

CHICKASAW COUNTY											
1979NASHUA 4 (LAT 42 47 25N LONG 092 32 28W)											
OCT 1989 04...	--	--	--	--	--	--	--	--	0.700	<0.100	
JUL 1990 24...	--	--	--	--	--	--	--	--	0.900	<0.100	
430211092270702 09514W (LAT 43 02 11N LONG 092 27 07W)											
JUL 1990 23...	14	2.5	260	1.5	43	0.80	--	318	<0.100	1.90	
431155092245801 09713W20CCCC (LAT 43 11 55N LONG 092 24 58W)											
JUL 1990 24...	--	--	--	--	--	--	--	--	<0.100	<0.100	
CLAY COUNTY											
425508095204001 09438W33BLD 07470 1955PETERSON 2 (LAT 42 55 08N LONG 095 20 40W)											
JUL 1990 30...	--	--	--	--	--	--	--	--	<0.100	1.70	
430923095113401 09637W03DDDD 1971SPENCER 1 (LAT 43 09 23N LONG 095 11 34W)											
JUL 1990 31...	--	--	--	--	--	--	--	--	0.300	<0.100	
415753090490411 08301E26CBDC CLINTON COUNTY 1963LOST NATION 2 (LAT 41 57 53N LONG 090 49 04W)											
OCT 1989 23...	--	--	--	--	--	0.30	--	--	4.00	<0.100	
414652090153201 08106E33ADA 1956CAMANCHE 2 (LAT 41 46 52N LONG 090 15 32W)											
AUG 1990 21...	--	--	--	--	--	--	--	--	6.20	<0.100	
415533095291101 08240W10CBAC CRAWFORD COUNTY 1982DOW CITY 3 (LAT 41 55 33N LONG 095 29 11W)											
AUG 1990 10...	--	--	--	--	--	--	--	--	6.30	<0.100	
420737095341501 08541W36CCAA 1971RICKETTS 4 (LAT 42 07 37N LONG 095 34 15W)											
AUG 1990 15...	--	--	--	--	--	--	--	--	2.60	<0.100	
420421095351801 08441W23CABA 1955CHARTER OAK 5 (LAT 42 04 21N LONG 095 35 18W)											
AUG 1990 15...	--	--	--	--	--	--	--	--	0.100	0.100	
420131095221101 08339W03DCAC 1976DENISON 7 (LAT 42 01 31N LONG 095 22 11W)											
AUG 1990 15...	--	--	--	--	--	--	--	--	1.10	<0.100	
420336095115601 08437W30BDAD 1936VAIL 1 (LAT 42 03 36N LONG 095 11 56W)											
AUG 1990 15...	23	<1.0	296	29	--	0.20	23	562	6.20	<0.100	
420551095185801 08438W07CDBA 1977DELOIT 5 (LAT 42 05 51N LONG 095 18 58W)											
AUG 1990 15...	11	1.3	276	20	--	0.20	21	464	<0.100	0.100	

GROUND-WATER-QUALITY DATA

DATE	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P)	IRON, DIS-SOLVED (UG/L AS FE)	MANGANESE, DIS-SOLVED (UG/L AS MN)	ATRAZINE, SOLVED (UG/L (UG/L)	CYANAZINE, TOTAL (UG/L)	METRI-BUZZIN IN WHOLE TOTAL (UG/L)	ALA-CHLOR IN WATER RECOVER (UG/L)	METOLA-CHLOR IN WHOLE WATER (UG/L)	TRIFLURA-LIN IN BUTYLATE TOTAL (UG/L)	
					[Pesticide concentration expressed as total recoverable]					
	(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	(99901)	(39030)

424725092322801 09414W18CAA0D CHICKASAW COUNTY
1979NASHUA 4 (LAT 42 47 25N LONG 092 32 28W)

430211092270702 09514W 1983 IONIA 2 (LAT 43 02 11N LONG 092 27 07W)

JUL 1990 23... <0.100 530 <20 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

431155092245801 09713W20CCCCC 1911ALTA VISTA 1 (LAT 43 11 55N LONG 092 24 58W)

JUL 1990 <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

CLAY COUNTY
425508095204001 09438W33BLD 07470 1955PETERSON 2 (LAT 42 55 08N LONG 095 20 40W)

JUL 1990
'30... <0.100 -- -- 0.82 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

430923095113401 09637W03DDDD 1971SPENCER 1 (LAT 43 09 23N LONG 095 11 34W)

JUL 1990 31... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

415753090490411 08301E26CBDC CLINTON COUNTY
1996LOST NATION 2 (LAT 41 57 53N LONG 090 49 04W)

414652090153201 08106E33ADA 1956CAMANCHE 2 (LAT 41 46 52N LONG 090 15 32W)

AUG 1990
21... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

415533095291101 08240W10CBAC 1982DOW CITY 3 (LAT 41 55 33N LONG 095 29 11W)

AUG 1990 10... 0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.20 <0.10 <0.10

420737095341501 08541W36CCAA 1971RICKETTS 4 (LAT 42 07 37N LONG 095 34 15W)

AUG 1990
15... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

420421095351801 08441W23CABA 1955CHARTER OAK 5 (LAT 42 04 21N LONG 095 35 18W)

AUG 1990
15... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

420131095221101 08339W03DCAC 1976DENISON 7 (LAT 42 01 31N LONG 095 22 11W)

AUG 1990 15... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

420336095115601 08437W30BDAD 1936VAIL 1 (LAT 42 03 36N LONG 095 11 56W)

AUG 1990 15... 0.100 <20 <20 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

420551095185801 08438W07CDBA 1977DELOIT 5 (LAT 42 05 51N LONG 095 18 58W)

AUG 1990
15... <0.100 <20 70 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

GROUND-WATER-QUALITY DATA

369

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN) (72004)	TEMPERATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)			
DALLAS COUNTY													
1976DALLAS CENTER 4 (LAT 41 41 30N LONG 094 02 15W)													
OCT 1989 02..	1430	111ALVM	158		20	12.0	669	--	--	--			
AUG 1990 08...	1145	111ALVM	145		60	13.0	685	7.0	--	--			
415055094131202 08129W10BBBA 1969DAWSON 2 (LAT 41 50 55N LONG 094 13 12W)													
OCT 1989 02..	1630	111ALVM	45		20	12.0	595	--	--	--			
AUG 1990 07...	1400	111ALVM	75		--	14.0	840	7.0	--	--			
415022094064101 08128W09DBDA 1964PERRY 11 (LAT 41 50 22N LONG 094 06 41W)													
JUL 1990 26...	1430	112PLSC	65		60	13.5	660	7.4	280	65			
415057094065401 08128W09ABBB 1954PERRY 9 (LAT 41 50 57N LONG 094 06 54W)													
JUL 1990 26...	1530	111ALVM	205		180	15.0	1080	7.3	630	170			
413749093592601 07927W21CDDA 1977ADEL 3 (LAT 41 37 49N LONG 093 59 26W)													
AUG 1990 08...	1300	111ALVM	290		60	15.0	620	7.3	370	100			
413305094001001 07827W18DBCB 1956DE SOTO 1 (LAT 41 33 05N LONG 094 00 10W)													
AUG 1990 08...	1330	111ALVM	125		--	13.5	1090	7.1	550	160			
414538093491504 08026W12ABAB 1972GRANGER 4 (LAT 41 45 38N LONG 093 49 15W)													
AUG 1990 15...	1215	112PLSC	25		20	15.0	750	7.5	--	--			
413148093570901 07827W27BBCA 1968VAN METER 2 (LAT 41 31 48N LONG 093 57 09W)													
AUG 1990 27...	1515	111ALVM	160		20	15.0	900	7.1	--	--			
422543091200701 08804W17DCBC DELAWARE COUNTY 1979DELHI 2 (LAT 42 25 43N LONG 091 20 07W)													
AUG 1990 30...	1105	350SLRN	315		30	11.0	450	7.7	--	--			
431820094582201 09835W15CBBC DICKINSON COUNTY 1981TERRIL 2 (LAT 43 18 20N LONG 094 58 22W)													
JUL 1990 31...	1000	112WSCS	90		15	11.0	880	7.2	510	150			
422817091070401 08902W31D DUBUQUE COUNTY 1978DYERSVILLE 3 (LAT 42 28 17N LONG 091 07 04W)													
AUG 1990 30...	1300	340DVSL	E400		E10	11.0	760	7.2	330	74			
422654090561201 08801W11CBB 17109 1964EPWORTH 2 (LAT 42 26 54N LONG 090 56 12W)													
AUG 1990 30...	1515	358ALXD	220		10	14.0	850	6.4	--	--			
423135090383201 08903E18AADD 1969DUBUQUE 9 (LAT 42 31 35N LONG 090 38 32W)													
AUG 1990 31...	0825	111ALVM	833		5	13.0	395	7.1	--	--			

GROUND-WATER-QUALITY DATA

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CACO3) (00940)	SULFATE DIS- SOLVED (MG/L AS CL) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS SO4) (00950)	SILICA, DIS- SOLVED (MG/L AS F) (00950)	SOLIDS, RESIDUE AT 180 DEG. C (MG/L AS SIO2) (00955)	NITRO- GEN, NO2+N03 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
	DALLAS COUNTY 1976 DALLAS CENTER 4 (LAT 41 41 30N LONG 094 02 15W)									
OCT 1989 02...	--	--	--	--	--	--	--	--	2.60	<0.100
AUG 1990 08...	--	--	--	--	--	--	--	--	4.90	<0.100
	414130094021501 08027W31CDAA									
	1969 DAWSON 2 (LAT 41 50 55N LONG 094 13 12W)									
OCT 1989 02...	--	--	--	--	--	--	--	--	9.40	<0.100
AUG 1990 07...	--	--	--	--	--	--	--	--	6.70	<0.100
	415055094131202 08129W10BBBA									
	1964 PERRY 11 (LAT 41 50 22N LONG 094 06 41W)									
JUL 1990 26...	56	6.7	362	11	1.5	0.50	18	466	<0.100	3.40
	415057094065401 08128W09ABBB									
	1954 PERRY 9 (LAT 41 50 57N LONG 094 06 54W)									
JUL 1990 26...	6.7	2.4	274	22	340	0.60	23	916	0.500	0.070
	413749093592601 07927W21CDDA									
	1977 ADEL 3 (LAT 41 37 49N LONG 093 59 26W)									
AUG 1990 08...	11	2.3	260	22	52	0.35	22	362	1.30	0.500
	413305094001001 07827W18DBCB									
	1956 DE SOTO 1 (LAT 41 33 05N LONG 094 00 10W)									
AUG 1990 08...	40	1.8	331	140	38	0.15	23	620	3.40	<0.100
	414538093491504 08026W12ABAB									
	1972 GRANGER 4 (LAT 41 45 38N LONG 093 49 15W)									
AUG 1990 15...	--	--	--	--	--	--	--	--	<0.100	1.90
	413148093570901 07827W27BBCA									
	1968 VAN METER 2 (LAT 41 31 48N LONG 093 57 09W)									
AUG 1990 27...	--	--	--	--	--	--	--	--	1.50	<0.100
	422543091200701 08804W17DCBC									
	DELAWARE COUNTY 1979 DELHI 2 (LAT 42 25 43N LONG 091 20 07W)									
AUG 1990 30...	--	--	--	--	--	--	--	--	0.100	<0.100
	431820094582201 09835W15CBBB									
	DICKINSON COUNTY 1981 TERRIL 2 (LAT 43 18 20N LONG 094 58 22W)									
JUL 1990 31...	11	4.2	--	1.0	140	0.40	30	600	0.100	0.500
	422817091070401 08902W31D									
	DUBUQUE COUNTY 1978 DYERSVILLE 3 (LAT 42 28 17N LONG 091 07 04W)									
AUG 1990 30...	13	2.1	256	28	27	0.10	14	388	13.0	<0.100
	422654090561201 08801W11CBB									
	17109 1964 EPWORTH 2 (LAT 42 26 54N LONG 090 56 12W)									
AUG 1990 30...	--	--	--	--	--	--	--	--	4.60	<0.100
	423135090383201 08903E18AADD									
	1969 DUBUQUE 9 (LAT 42 31 35N LONG 090 38 32W)									
AUG 1990 31...	--	--	--	--	--	--	--	--	<0.100	0.400

GROUND-WATER-QUALITY DATA

371

DATE	PHOS-	IRON,	MANGA-	METRI-				METOLA-	TRI-
	PHORUS ORTHO, DIS- SOLVED (MG/L AS P)	DIS- SOLVED (UG/L AS FE)	NESE, DIS- SOLVED (UG/L AS MN)	ATRA- ZINE, TOTAL (UG/L)	CYAN- AZINE, TOTAL (UG/L)	BUZIN WHOLE (UG/L)	ALA- CHLOR TOTAL (UG/L)	CHLOR IN WHOLE WATER (UG/L)	FLURA- LIN TOTAL RECOVER (UG/L)
	(00671)	(01046)	(01056)	[Pesticide concentration expressed as total recoverable] (39630)	(81757)	(81408)	(77825)	(39356)	(99901) (39030)

DALLAS COUNTY 414130094021501 08027W31CDAA 1976DALLAS CENTER 4 (LAT 41 41 30N LONG 094 02 15W)									
OCT 1989 02...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	-- <0.10
AUG 1990 08...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415055094131202 08129W10BBBA 1969DAWSON 2 (LAT 41 50 55N LONG 094 13 12W)									
OCT 1989 02...	0.100	--	--	0.87	<0.10	<0.10	<0.10	<0.10	-- <0.10
AUG 1990 07...	0.100	--	--	0.63	<0.10	<0.10	<0.10	<0.10	<0.10
415022094064101 08128W09DBDA 1964PERRY 11 (LAT 41 50 22N LONG 094 06 41W)									
JUL 1990 26...	1430	112PLSC	65	60	13.5	660	7.4	280	65 29
415057094065401 08128W09ABBB 1954PERRY 9 (LAT 41 50 57N LONG 094 06 54W)									
JUL 1990 26...	1530	111ALVM	205	180	15.0	1080	7.3	630	170 50
413749093592601 07927W21CDDA 1977ADEL 3 (LAT 41 37 49N LONG 093 59 26W)									
AUG 1990 08...	1300	111ALVM	290	60	15.0	620	7.3	370	100 29
413305094001001 07827W18DBC 1956DE SOTO 1 (LAT 41 33 05N LONG 094 00 10W)									
AUG 1990 08...	1330	111ALVM	125	--	13.5	1090	7.1	550	160 36
414538093491504 08026W12ABAB 1972GRANGER 4 (LAT 41 45 38N LONG 093 49 15W)									
AUG 1990 15...	1215	112PLSC	25	20	15.0	750	7.5	--	-- --
413148093570901 07827W27BBCA 1968VAN METER 2 (LAT 41 31 48N LONG 093 57 09W)									
AUG 1990 27...	1515	111ALVM	160	20	15.0	900	7.1	--	-- --
422543091200701 08804W17DCBC DELAWARE COUNTY 1979DELHI 2 (LAT 42 25 43N LONG 091 20 07W)									
AUG 1990 30...	1105	350SLRN	315	30	11.0	450	7.7	--	-- --
431820094582201 09835W15CB 1981TERRIL 2 (LAT 43 18 20N LONG 094 58 22W)									
JUL 1990 31...	1000	112WSCS	90	15	11.0	880	7.2	510	150 33
422817091070401 08902W31D DUBUQUE COUNTY 1978DYERSVILLE 3 (LAT 42 28 17N LONG 091 07 04W)									
AUG 1990 30...	1300	340DVSL	E400	E10	11.0	760	7.2	330	74 36
422654090561201 08801W11CBB 17109 1964EPWORTH 2 (LAT 42 26 54N LONG 090 56 12W)									
AUG 1990 30...	1515	358ALXD	220	10	14.0	850	6.4	--	-- --
423135090383201 08903E18AADD 1969DUBUQUE 9 (LAT 42 31 35N LONG 090 38 32W)									
AUG 1990 31...	0825	111ALVM	833	5	13.0	395	7.1	--	-- --

GROUND-WATER-QUALITY DATA

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN) (72004)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO ₃) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	
432339094500101 09934W14BCAC				EMMET COUNTY 1972ESTHERVILLE 10 (LAT 43 23 39N LONG 094 50 01W)							
JUL 1990 31...	1100	3600VCB	600	15	15.0	1060	7.1	780	210	63	
432348094285201 09931W14BBCD				1981ARMSTRONG 5 (LAT 43 23 48N LONG 094 28 52W)							
JUL 1990 31...	1430	112PLSC	320	20	10.5	1140	7.3	580	160	44	
425614091572902 09409W19CCD				FAYETTE COUNTY HAWKEYE 2 (LAT 42 56 14N LONG 091 57 29W)							
AUG 1990 22...	1140	112PLSC	E150	E30	9.5	650	7.4	330	94	24	
425720091484201 09408W17DBAC				08615 1957WEST UNION 2 (LAT 42 57 20N LONG 091 48 50W)							
AUG 1990 22...	1250	355NIGR	200	10	10.5	875	7.5	--	--	--	
430458092403703 09516W01AAB				FLOYD COUNTY 15317 1963CHARLES CITY 7 (LAT 43 04 58N LONG 092 40 37W)							
JUL 1990 24...	0830	344CDVL	2750	15	13.0	430	7.0	230	63	18	
430315092563401 09518W11CCBD				1978ROCKFORD 2 (LAT 43 03 15N LONG 092 56 34W)							
AUG 1990 06...	1200	344CDVL	200	15	12.5	450	7.2	310	87	23	
425341093132501 09320W05DDD				FRANKLIN COUNTY 1956SHEFFIELD 2 (LAT 42 53 41N LONG 093 13 25W)							
OCT 1989 04...	1145	110QRNR	40	30	13.0	570	7.2	--	--	--	
425342093133101 09320W05DDBB				1977SHEFFIELD 3 (LAT 42 53 42N LONG 093 13 31W)							
JUL 1990 23...	1215	111ALVM	60	15	12.5	420	7.0	--	--	--	
404331095285501 06840W07CBDA				FREMONT COUNTY 1980FARRAGUT 79 1 (LAT 40 43 31N LONG 095 28 55W)							
JUL 1990 17...	1430	112PLSC	165	25	12.0	688	6.7	--	--	--	
405225095335001 06841W14CDBB				1966RANDOLPH 3 (LAT 40 52 25N LONG 095 33 50W)							
JUL 1990 17...	1600	111ALVM	100	25	12.5	685	6.7	350	88	32	
403558095393901 06742W28AAAB				1982HAMBURG 6 (LAT 40 35 58N LONG 095 39 39W)							
JUL 1990 19...	0925	111ALVM	300	1620	13.0	872	6.9	460	120	39	
404918095454801 07043W35CBBA				1973THURMAN 1 (LAT 40 49 18N LONG 095 45 48W)							
JUL 1990 19...	1730	111ALVM	117	45	12.0	820	6.9	--	--	--	
420053094223001 08330W08CBBA				GREENE COUNTY 1980JEFFERSON 6 (LAT 42 00 53N LONG 094 22 30W)							
AUG 1990 01...	1330	112PLSC	440	15	13.5	800	7.1	510	140	39	

GROUND-WATER-QUALITY DATA

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DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY (MG/L AS) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS) (00955)	SOLIDS, AT 180 DEG. C (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	
EMMET COUNTY											
JUL 1990 31...	432339094500101	09934W14BCAC			1972ESTHERVILLE	10	(LAT 43 23 39N LONG 094 50 01W)				
	92	4.5	280		3.0	--	0.45	23	1240	0.100	1.20
FAYETTE COUNTY											
JUL 1990 31...	432348094285201	09931W14BBCD			1981ARMSTRONG	5	(LAT 43 23 48N LONG 094 28 52W)				
	48	3.4	404		1.0	240	--	31	772	0.100	0.900
FLOYD COUNTY											
AUG 1990 22...	425614091572902	09409W19CCCD			HAWKEYE	2	(LAT 42 56 14N LONG 091 57 29W)				
	7.7	1.9	268		12	49	0.40	18	370	<0.100	0.600
FRANKLIN COUNTY											
AUG 1990 22...	425720091484201	09408W17DBAC	08615	1957WEST UNION	2	(LAT 42 57 20N LONG 091 48 50W)					
	--	--	--		--	--	--	--	--	13.0	<0.100
FREMONT COUNTY											
JUL 1990 24...	430458092403703	09516W01AAB	15317	1963CHARLES CITY	7	(LAT 43 04 58N LONG 092 40 37W)					
	4.1	1.4	203		3.5	24	--	13	236	<0.100	0.400
GREENE COUNTY											
AUG 1990 06...	430315092563401	09518W11CCBD			1978ROCKFORD	2	(LAT 43 03 15N LONG 092 56 34W)				
	4.0	<1.0	242		5.0	30	--	13	258	<0.100	0.100
HARRAGUT COUNTY											
AUG 1990 06...	425341093132501	09320W05DDD			1956SHEFFIELD	2	(LAT 42 53 41N LONG 093 13 25W)				
OCT 1989 04...	--	--	--		--	--	--	--	--	11.0	<0.100
JEFFERSON COUNTY											
JUL 1990 23...	425342093133101	09320W05DDBB			1977SHEFFIELD	3	(LAT 42 53 42N LONG 093 13 31W)				
	--	--	--		--	--	--	--	--	0.800	<0.100
JEFFERSON COUNTY											
JUL 1990 17...	404331095285501	06840W07CBDA			1980FARRAGUT	79	(LAT 40 43 31N LONG 095 28 55W)				
	--	--	--		--	--	--	--	--	0.100	0.200
JEFFERSON COUNTY											
JUL 1990 17...	405225095335001	06841W14CDBB			1966RANDOLPH	3	(LAT 40 52 25N LONG 095 33 50W)				
	11	4.3	258		14	--	0.40	20	420	4.30	<0.100
JEFFERSON COUNTY											
JUL 1990 19...	403558095393901	06742W28AAAB			1982HAMBURG	6	(LAT 40 35 58N LONG 095 39 39W)				
	28	6.2	354		44	--	0.30	28	636	0.200	0.400
JEFFERSON COUNTY											
JUL 1990 19...	404918095454801	07043W35CBBA			1973THURMAN	1	(LAT 40 49 18N LONG 095 45 48W)				
	--	--	--		--	--	--	--	--	0.100	0.300
JEFFERSON COUNTY											
AUG 1990 01...	420053094223001	08330W08CBBA			1980JEFFERSON	6	(LAT 42 00 53N LONG 094 22 30W)				
	27	2.1	402		21	75	0.25	21	504	<0.100	2.50

GROUND-WATER-QUALITY DATA

GROUND-WATER-QUALITY DATA

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GROUND-WATER-QUALITY DATA

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (MG/L AS 70300) (00631)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
GREENE COUNTY 1977SCRANTON 4 (LAT 42 01 04N LONG 094 32 43W)										
AUG 1990 07...	--	--	--	--	--	--	--	<0.100	1.00	
GRUNDY COUNTY 1966CONRAD 4 (LAT 42 13 35N LONG 092 52 35W)										
OCT 1989 06...	--	--	--	--	--	--	--	5.20	<0.100	
421306092492101 08617W34BCDB 08352 1957BEAMAN 1 (LAT 42 13 06N LONG 092 49 21W)										
AUG 1990 03...	13	<1.0	288	18	43	0.20	17	380	11.0	<0.100
422811092374901 08815W05BBBD 1935DIKE 1 (LAT 42 28 07N LONG 092 37 49W)										
AUG 1990 06...	18	1.5	260	4.0	48	0.75	14	284	<0.100	2.00
414035094302502 07931W06CDBC 1941GUTHRIE CENTER 2 (LAT 41 40 35N LONG 094 30 25W)										
OCT 1989 03...	--	--	--	--	--	--	--	--	4.90	<0.100
422333093434901 08825W35BDDDB 1977KAMRAR 2 (LAT 42 23 33N LONG 093 43 49W)										
AUG 1990 06...	43	4.0	422	2.0	24	0.85	26	396	<0.100	3.40
425533093364001 09423W30CCD 1941GOODELL 2 (LAT 42 55 33N LONG 093 36 40W)										
JUL 1990 25...	--	--	--	--	--	--	--	--	0.100	1.00
425939093572302 09426W06ABAA 06225 1953CORWITH 2 (LAT 42 59 39N LONG 093 27 23W)										
JUL 1990 25...	82	3.8	432	2.0	160	--	24	619	0.100	0.600
430546093360901 09623W31ABAD 08640 1957GARNER 2 (LAT 43 05 46N LONG 093 36 09W)										
JUL 1990 25...	7.7	2.9	376	5.5	13	--	14	358	<0.100	0.300
430539093482201 09625W33BAAC 00554 1937BRITT 1 (LAT 43 05 39N LONG 093 48 22W)										
JUL 1990 25...	--	--	--	--	--	--	--	--	<0.100	0.300
423036093163401 08921W13BABD 09059 1957IOWA FALLS 5 (LAT 42 30 36N LONG 093 16 34W)										
AUG 1990 02...	8.7	1.2	342	15	40	0.25	30	370	0.200	0.500
415119095361401 08141W03DBBD HARRISON COUNTY 1954DUNLAP 2 (LAT 41 51 19N LONG 095 36 14W)										
AUG 1990 10...	13	3.0	398	25	--	0.20	27	590	9.80	<0.100
413830095465802 07942W19BDBD 1875LOGAN 6 (LAT 41 38 30N LONG 095 46 58W)										
AUG 1990 10...	10	2.9	347	12	--	0.25	24	450	4.80	0.200

GROUND-WATER-QUALITY DATA

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DATE	PHOS- PHORUS		MANGA- NESE,		METRI- BUZIN		METOLA- CHLOR		TRI- FLURA-	
	ORTHO, DIS- SOLVED (MG/L AS P)	IRON, DIS- SOLVED (UG/L AS FE)	DIS- SOLVED (UG/L AS MN)	ATRA- ZINE, TOTAL (UG/L)	CYAN- AZINE (UG/L)	WHOLE TOTAL (UG/L)	ALA- IN (UG/L)	CHLOR TOTAL (UG/L)	IN WHOLE (UG/L)	LIN BUTY- WATER (UG/L)
	[Pesticide concentration expressed as total recoverable]									
	(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	(99901)	(39030)

420104094324301 08332W11BDBD GREENE COUNTY
1977SCRANTON 4 (LAT 42 01 04N LONG 094 32 43W)

AUG 1990
07... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

421336092524401 08617W30CDDB 19097 1966CONRAD 4 (LAT 42 13 35N LONG 092 52 35W) GRUNDY COUNTY

OCT 1989
06... <0.100 -- -- 0.24 <0.10 <0.10 <0.10 <0.10 -- <0.10

421306092492101 08617W34BCDB 08352 1957BEAMAN 1 (LAT 42 13 06N LONG 092 49 21W)

AUG 1990
03... <0.100 <20 <20 0.18 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

422811092374901 08815W05BBBD 1935DIKE 1 (LAT 42 28 07N LONG 092 37 49W)

414035094302502 07931W06CDBC GUTHRIE COUNTY
191GUTHRIE CENTER 2 (LAT 41 40 35N LONG 094 30 25W)

OCT 1989
03... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 -- <0.10

422333093434901 08825W35BDDBB HAMILTON COUNTY
1977KAMRAR 2 (LAT 42 23 33N LONG 093 43 49W)

AUG 1990
06... <0.100 50 420 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

435533000336/001 001/03/2020 CCPD HANCOCK COUNTY 1-1816002ELL-3 (LAT 43-55-33N LONG 003-36-46W)

JUL 1990 10 10 10 10 10 10 10 10 10 10

4-250230003572302 08/26W056ABAA 06325 1053GDPWHTW 3 (LAT: 43.50, 30N LONG: 003.23, 23W)

JUL 1990 10-100 1000 100 10-10 10-10 10-10 10-10 10-10

JUL 1990

HARDIN COUNTY
423036093163401 08921W13BABD 09059 1957IOWA FALLS 5 (LAT 42 30 36N LONG 093 16 34W)

AUG 1990
02... <0.100 680 130 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

415119095361401 08141W03DBBD HARRISON COUNTY
1954DUNLAP 2 (LAT 41 51 19N LONG 095 36 14W)

AUG 1990 10... <0.100 70 480 <0.10 <0.10 <0.10 <0.10 <0.20 <0.10 <0.10

413830095465802 07942W19BDDBD 1975LOGAN 6 (LAT 41 38 30N LONG 095 46 58W)

GROUND-WATER-QUALITY DATA

	GROSS	GROSS
	ALPHA,	BETA,
	DIS-	DIS-
	SOLVED	SOLVED
DATE	(PCI/L AS U-NAT) (01515)	(PCI/L AS CS-137) (03515)

420104094324301 08332W11BDBD GREENE COUNTY
 1977SCRANTON 4 (LAT 42 01 04N LONG 094 32 43W)

AUG 1990
 07... -- --

421336092524401 08617W30CDBB 19097 1966CONRAD 4 (LAT 42 13 35N LONG 092 52 35W)

OCT 1989
 06... -- --

421306092492101 08617W34BCDB 08352 1957BEAMAN 1 (LAT 42 13 06N LONG 092 49 21W)

AUG 1990
 03... -- --

422811092374901 08815W05BBBD 1935DIKE 1 (LAT 42 28 07N LONG 092 37 49W)

AUG 1990
 06... -- --

414035094302502 07931W06CDBC GUTHRIE COUNTY
 1941GUTHRIE CENTER 2 (LAT 41 40 35N LONG 094 30 25W)

OCT 1989
 03... -- --

422333093434901 08825W35BDDDB HAMILTON COUNTY
 1977KAMRAR 2 (LAT 42 23 33N LONG 093 43 49W)

AUG 1990
 06... -- --

425533093364001 09423W30CCD HANCOCK COUNTY
 1941GOODELL 2 (LAT 42 55 33N LONG 093 36 40W)

JUL 1990
 25... -- --

425939093572302 09426W06ABAA 06225 1953CORWITH 2 (LAT 42 59 39N LONG 093 27 23W)

JUL 1990
 25... -- --

430546093360901 09623W31ABAD 08640 1957GARNER 2 (LAT 43 05 46N LONG 093 36 09W)

JUL 1990
 25... <1.5 <3.2

430539093482201 09625W33BAAC 00554 1937BRITT 1 (LAT 43 05 39N LONG 093 48 22W)

JUL 1990
 25... -- --

423036093163401 08921W13BABD HARDIN COUNTY
 09059 1957IOWA FALLS 5 (LAT 42 30 36N LONG 093 16 34W)

AUG 1990
 02... -- --

415119095361401 08141W03DBBD HARRISON COUNTY
 1954DUNLAP 2 (LAT 41 51 19N LONG 095 36 14W)

AUG 1990
 10... -- --

413830095465802 07942W19BDBD 1975LOGAN 6 (LAT 41 38 30N LONG 095 46 58W)

AUG 1990
 10... -- --

GROUND-WATER-QUALITY DATA

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DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN) (72004)	TEMPERATURE WATER (DEG C) (00010)	SPE-CIFIC CONDUCTANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
HARRISON COUNTY 1964MISSOURI VALLEY 1 (LAT 41 33 23N LONG 095 53 31W)										
AUG 1990 23...	1100	111ALVM	800	240	12.5	1030	7.2	540	130	53
414234096012401 08045W25DAAC 1956MONDAMIN 1 (LAT 41 42 34N LONG 096 01 24W)										
SEP 1990 07...	0900	111ALVM	110	30	11.5	1160	7.3	--	--	--
414842096012501 08145W24DABD 1972LITTLE SIOUX 1 (LAT 41 48 42N LONG 096 01 25W)										
SEP 1990 14...	0945	111ALVM	60	40	11.5	1260	7.1	--	--	--
431443092261401 09714W01DDAB HOWARD COUNTY 1914ELMA 1 (LAT 43 14 43N LONG 092 26 14W)										
OCT 1989 04...	1430	112PLSC	133	30	12.0	730	7.4	--	--	--
424308094132601 09129W01CCAC HUMBOLDT COUNTY 1973HUMBOLDT 1 (LAT 42 43 08N LONG 094 13 26W)										
JUL 1990 25...	1040	330MSSP	990	120	11.0	645	7.2	350	92	29
422915095323504 X IDA COUNTY 1985HOLSTEIN 3 (LAT 42 29 15N LONG 095 32 35W)										
AUG 1990 14...	1530	111ALVM	110	30	10.0	780	7.2	400	110	30
422018095205101 08739W23ABDD 1923ARTHUR 1 (LAT 42 20 18N LONG 095 20 51W)										
AUG 1990 14...	1730	111ALVM	100	20	12.0	725	7.3	--	--	--
421908095353701 08741W26CBBB 1972BATTLE CREEK 3 (LAT 42 19 08N LONG 095 35 37W)										
AUG 1990 15...	0810	111ALVM	280	20	12.0	710	7.3	--	--	--
414745091521201 08109W26BCDC IOWA COUNTY 1942AMANA 5 (LAT 41 47 45N LONG 091 52 12W)										
AUG 1990 16...	1315	111ALVM	40	120	12.0	745	7.2	--	--	--
414811091564001 08109W30BBAB 1969HIGH AMANA 10 (LAT 41 48 11N LONG 091 56 40W)										
AUG 1990 16...	1430	111ALVM	30	120	14.0	645	7.3	--	--	--
414737092044101 08111W25CACD 1980MARENGO 9 (LAT 41 47 37N LONG 092 04 41W)										
AUG 1990 16...	1515	111ALVM	175	60	12.0	520	7.5	--	--	--
414514092105801 08012W12ADDD 1979LADORA 2 (LAT 41 45 14N LONG 092 10 58W)										
AUG 1990 16...	1615	112PLSC	80	15	12.0	970	7.8	--	--	--
420241090232401 08405E33BBBC JACKSON COUNTY 00548 1937PRESTON 1 (LAT 42 02 48N LONG 090 23 35W)										
AUG 1990 31...	1005	364STPR	--	5	13.0	715	7.3	280	62	30

GROUND-WATER-QUALITY DATA

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (00955)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	
	HARRISON COUNTY 413323095533101 07844W15CABC 1964MISSOURI VALLEY 1 (LAT 41 33 23N LONG 095 53 31W)										
AUG 1990 23...	36	5.4	426	38	120	0.25	24	644	1.00	<0.100	
	414234096012401 08045W25DAAC 1956MONDAMIN 1 (LAT 41 42 34N LONG 096 01 24W)										
SEP 1990 07...	--	--	--	--	--	--	--	--	<0.100	1.30	
	414842096012501 08145W24DABD 1972LITTLE SIOUX 1 (LAT 41 48 42N LONG 096 01 25W)										
SEP 1990 14...	--	--	--	--	--	--	--	--	<0.100	1.00	
	HOWARD COUNTY 431443092261401 09714W01DDAB 1914ELMA 1 (LAT 43 14 43N LONG 092 26 14W)										
OCT 1989 04...	--	--	--	--	--	--	--	--	7.80	<0.100	
	424308094132601 09129W01CCAC HUMBOLDT COUNTY 1973HUMBOLDT 1 (LAT 42 43 08N LONG 094 13 26W)										
JUL 1990 25...	5.9	3.3	260	18	52	--	21	384	5.90	<0.100	
	422915095323504 X IDA COUNTY 1985HOLSTEIN 3 (LAT 42 29 15N LONG 095 32 35W)										
AUG 1990 14...	12	<1.0	284	22	--	0.30	19	460	11.0	<0.100	
	422018095205101 08739W23ABDD 1923ARTHUR 1 (LAT 42 20 18N LONG 095 20 51W)										
AUG 1990 14...	--	--	--	--	--	--	--	--	12.0	<0.100	
	421908095353701 08741W26CBBB 1972BATTLE CREEK 3 (LAT 42 19 08N LONG 095 35 37W)										
AUG 1990 15...	--	--	--	--	--	--	--	--	11.0	<0.100	
	414745091521201 08109W26BCDC IOWA COUNTY 1942AMANA 5 (LAT 41 47 45N LONG 091 52 12W)										
AUG 1990 16...	--	--	--	--	--	--	--	--	3.90	0.100	
	414811091564001 08109W30BBAB 1969HIGH AMANA 10 (LAT 41 48 11N LONG 091 56 40W)										
AUG 1990 16...	--	--	--	--	--	--	--	--	5.80	<0.100	
	414737092044101 08111W25CACD 1980MARENGO 9 (LAT 41 47 37N LONG 092 04 41W)										
AUG 1990 16...	--	--	--	--	--	--	--	--	4.50	<0.100	
	414514092105801 08012W12ADDD 1979LADORA 2 (LAT 41 45 14N LONG 092 10 58W)										
AUG 1990 16...	--	--	--	--	--	--	--	--	<0.100	4.50	
	JACKSON COUNTY 420241090232401 08405E33BBC 00548 1937PRESTON 1 (LAT 42 02 48N LONG 090 23 35W)										
AUG 1990 31...	30	9.2	254	30	61	0.45	8.9	390	<0.100	0.300	

GROUND-WATER-QUALITY DATA

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DATE	PHOS- PHORUS		MANGA- NESE,		METRI- BUZIN		METOLA- CHLOR		TRI- FLURA-	
	ORTHO, DIS- SOLVED (MG/L AS P)	IRON, DIS- SOLVED (UG/L AS FE)	DIS- SOLVED (UG/L AS MN)	ATRA- ZINE, TOTAL (UG/L)	CYAN- AZINE (UG/L)	TOTAL (UG/L)	WHOLE WATER (UG/L)	TOTAL RECOVER (UG/L)	WHOLE WATER (UG/L)	BUTY- LATE (UG/L)
	[Pesticide concentration expressed as total recoverable]									
	(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	(99901)	(39030)

GROUND-WATER-QUALITY DATA

DATE	GROSS ALPHA, DIS- SOLVED (PCI/L U-NAT) (01515)	GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515)	RADIUM 226, DIS- SOLVED (PCI/L (09503)

HARRISON COUNTY
413323095533101 07844W15CABC 1964MISSOURI VALLEY 1 (LAT 41 33 23N LONG 095 53 31W)

AUG 1990
23... -- -- --

414234096012401 08045W25DAAC 1956MONDAMIN 1 (LAT 41 42 34N LONG 096 01 24W)

SEP 1990
07... -- -- --

414842096012501 08145W24DABD 1972LITTLE SIOUX 1 (LAT 41 48 42N LONG 096 01 25W)

SEP 1990
14... -- -- --

HOWARD COUNTY
431443092261401 09714W01DDAB 1914ELMA 1 (LAT 43 14 43N LONG 092 26 14W)

OCT 1989
04... -- -- --

HUMBOLDT COUNTY
424308094132601 09129W01CCAC 1973HUMBOLDT 1 (LAT 42 43 08N LONG 094 13 26W)

JUL 1990
25... -- -- --

IDA COUNTY
422915095323504 X 1985HOLSTEIN 3 (LAT 42 29 15N LONG 095 32 35W)

AUG 1990
14... -- -- --

422018095205101 08739W23ABDD 1923ARTHUR 1 (LAT 42 20 18N LONG 095 20 51W)

AUG 1990
14... -- -- --

421908095353701 08741W26CBBB 1972BATTLE CREEK 3 (LAT 42 19 08N LONG 095 35 37W)

AUG 1990
15... -- -- --

IOWA COUNTY
414745091521201 08109W26BCDC 1942AMANA 5 (LAT 41 47 45N LONG 091 52 12W)

AUG 1990
16... -- -- --

414811091564001 08109W30BBAB 1969HIGH AMANA 10 (LAT 41 48 11N LONG 091 56 40W)

AUG 1990
16... -- -- --

414737092044101 08111W25CACD 1980MARENGO 9 (LAT 41 47 37N LONG 092 04 41W)

AUG 1990
16... -- -- --

414514092105801 08012W12ADDD 1979LADORA 2 (LAT 41 45 14N LONG 092 10 58W)

AUG 1990
16... -- -- --

JACKSON COUNTY
420241090232401 08405E33BBC 00548 1937PRESTON 1 (LAT 42 02 48N LONG 090 23 35W)

AUG 1990
31... 7.3 17 3.7

GROUND-WATER-QUALITY DATA

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DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	OR FLOW PERIOD PRIOR TO SAMPLING (MIN) (72004)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-STIUM, DIS-SOLVED (MG/L AS MG) (00925)	
JACKSON COUNTY BALDWIN 2 (LAT 42 04 33N LONG 090 50 24W)											
420433090502401 08401E22											
AUG 1990 31...	1135	340DVSL	130		10	10.5	670	7.3	340	73	38
JASPER COUNTY 1939KELLOGG 1 (LAT 41 42 51N LONG 092 54 17W)											
OCT 1989 19...	1100	111ALVM	30		20	11.0	920	6.6	--	--	--
414024093153901 07921W11ABBB 04510 1950PRAIRIE CITY 1 (LAT 41 40 24N LONG 093 15 39W)											
AUG 1990 15...	1430	111ALVM	200		15	12.0	560	7.5	--	--	--
413049093062001 07820W36DABC 1981MONROE 8 (LAT 41 30 49N LONG 093 06 20W)											
AUG 1990 15...	1515	325DSMS	30		120	14.0	858	7.4	450	120	36
413846093063801 07919W18CDCB NEWTON 21 (LAT 41 38 46N LONG 093 06 38W)											
AUG 1990 16...	0900	111ALVM	E360		E180	14.0	1040	7.2	660	180	50
JOHNSON COUNTY NORTH LIBERTY 3 (LAT 41 44 46N LONG 091 35 35W)											
JUL 1990 20...	0935	340DVSL	--		E15	12.0	1130	7.0	560	140	51
414110091352201 07906W06BAAA 1975CORALVILLE 6 (LAT 41 41 10N LONG 091 35 22W)											
AUG 1990 31...	1000	112PLSC	250		120	12.5	670	7.3	330	81	31
JONES COUNTY 1969ANAMOSA 4 (LAT 42 07 13N LONG 091 16 51W)											
AUG 1990 30...	1330	371TMPL	<525		15	22.0	830	7.8	270	58	31
KEOKUK COUNTY 1958SIGOURNEY 5 (LAT 41 18 49N LONG 092 11 54W)											
OCT 1989 20...	1330	111ALVM	--		10	11.0	558	7.0	--	--	--
412723092052001 07711W23D SOUTH ENGLISH 1 (LAT 41 27 23N LONG 092 05 20W)											
AUG 1990 14...	1430	111ALVM	E37		E45	12.0	572	6.4	300	83	22
411748092114401 07512W12CBDA 1964SIGOURNEY 6 (LAT 41 17 48N LONG 092 11 44W)											
AUG 1990 15...	1630	111ALVM	40		60	12.0	496	6.6	240	76	12
KOSSUTH COUNTY 1968ALGONA 6 (LAT 43 04 24N LONG 094 14 27W)											
JUL 1990 24...	1545	217DKOT	500		20	11.0	980	7.3	440	120	35
430340094252703 09530W08BBCD 1978WHITTEMORE 3 (LAT 43 03 40N LONG 094 25 27W)											
JUL 1990 24...	1435	112PLSC	112		20	11.5	1050	7.4	--	--	--

GROUND-WATER-QUALITY DATA

GROUND-WATER-QUALITY DATA

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DATE	PHOS- PHORUS		MANGA- NESE,		METRI- BUZIN		METOLA- CHLOR		TRI- FLURA-	
	ORTHO, DIS- SOLVED (MG/L AS P)	IRON, DIS- SOLVED (UG/L AS FE)	DIS- SOLVED (UG/L AS MN)	ATRA- SOLVED (UG/L)	CYAN- ZINE, TOTAL (UG/L)	AZINE TOTAL (UG/L)	WHOLE WATER (UG/L)	TOTAL WATER (UG/L)	WHOLE RECOVER (UG/L)	BUTY- LATE (UG/L)
	(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	(99901)	(39030)

[Pesticide concentration expressed as total recoverable]

420433090502401 08401E22				JACKSON COUNTY BALDWIN 2 (LAT 42 04 33N LONG 090 50 24W)							
AUG 1990 31...	<0.100	<20	<20	0.17	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414251092541701 08018W26AADC				JASPER COUNTY 1939KELLOGG 1 (LAT 41 42 51N LONG 092 54 17W)							
OCT 1989 19...	<0.100	--	--	0.62	<0.10	<0.10	<0.10	<0.10	<0.10	--	<0.10
414024093153901 07921W11ABBB	04510	1950PRAIRIE CITY 1 (LAT 41 40 24N LONG 093 15 39W)									
AUG 1990 15...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10
413049093062001 07820W36DACP				1981MONROE 8 (LAT 41 30 49N LONG 093 06 20W)							
AUG 1990 15...	<0.100	650	20	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
413846093063801 07919W18CDCB				NEWTON 21 (LAT 41 38 46N LONG 093 06 38W)							
AUG 1990 16...	<0.100	2000	1100	0.21	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
414446081353501 08006W07CDCB				JOHNSON COUNTY NORTH LIBERTY 3 (LAT 41 44 46N LONG 091 35 35W)							
JUL 1990 20...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414110091352201 07906W06BAAA				1975CORALVILLE 6 (LAT 41 41 10N LONG 091 35 22W)							
AUG 1990 31...	<0.100	290	510	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420718091165401 08404W02BABC	21773	1969ANAMOSA 4 (LAT 42 07 13N LONG 091 16 51W)		JONES COUNTY							
AUG 1990 30...	<0.100	2400	20	--	--	--	--	--	--	--	--
411849092115401 07512W12CBCA				KEOKUK COUNTY 1958SIGOURNEY 5 (LAT 41 18 49N LONG 092 11 54W)							
OCT 1989 20...	<0.100	--	--	<0.10	0.19	<0.10	<0.10	<0.10	--	<0.10	<0.10
412723092052001 07711W23D				SOUTH ENGLISH 1 (LAT 41 27 23N LONG 092 05 20W)							
AUG 1990 14...	<0.100	170	60	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
411748092114401 07512W12CBDA				1964SIGOURNEY 6 (LAT 41 17 48N LONG 092 11 44W)							
AUG 1990 15...	<0.100	16000	1400	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430424094142701 09529W02CABC				KOSSUTH COUNTY 1968ALGONA 6 (LAT 43 04 24N LONG 094 14 27W)							
JUL 1990 24...	<0.100	1600	380	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430340094252703 09530W08BBCD				1978WHITTEMORE 3 (LAT 43 03 40N LONG 094 25 27W)							
JUL 1990 24...	--	--	--	--	--	--	--	--	--	0.100	0.800

GROUND-WATER-QUALITY DATA

DATE	GROSS ALPHA, DIS- SOLVED (PCI/L U-NAT) (01515)	GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515)	RADIUM 226, DIS- SOLVED (PCI/L (09503)
	JACKSON COUNTY BALDWIN 2 (LAT 42 04 33N LONG 090 50 24W)		
420433090502401 08401E22	AUG 1990 31...	-- -- --	
414251092541701 08018W26AACD	OCT 1989 19...	JASPER COUNTY 1939KELLOGG 1 (LAT 41 42 51N LONG 092 54 17W)	
414024093153901 07921W11ABBB	AUG 1990 15...	1950PRAIRIE CITY 1 (LAT 41 40 24N LONG 093 15 39W)	
413049093062001 07820W36DACB	AUG 1990 15...	1981MONROE 8 (LAT 41 30 49N LONG 093 06 20W)	
413846093063801 07919W18CDCB	AUG 1990 16...	NEWTON 21 (LAT 41 38 46N LONG 093 06 38W)	
414446091353501 08006W07CDCB	JUL 1990 20...	JOHNSON COUNTY NORTH LIBERTY 3 (LAT 41 44 46N LONG 091 35 35W)	
414110091352201 07906W06BAAA	AUG 1990 31...	1975CORALVILLE 6 (LAT 41 41 10N LONG 091 35 22W)	
420718091165401 08404W02BABC	AUG 1990 30...	JONES COUNTY 1969ANAMOSA 4 (LAT 42 07 13N LONG 091 16 51W)	
411849092115401 07512W12CBCA	OCT 1989 20...	KEOKUK COUNTY 1958SIGOURNEY 5 (LAT 41 18 49N LONG 092 11 54W)	
412723092052001 07711W23D	AUG 1990 14...	SOUTH ENGLISH 1 (LAT 41 27 23N LONG 092 05 20W)	
411748092114401 07512W12CBDA	AUG 1990 15...	1964SIGOURNEY 6 (LAT 41 17 48N LONG 092 11 44W)	
430424094142701 09529W02CABC	JUL 1990 24...	KOSSUTH COUNTY 1968ALGONA 6 (LAT 43 04 24N LONG 094 14 27W)	
430340094252703 09530W08BBCD	JUL 1990 24...	1978WHITTEMORE 3 (LAT 43 03 40N LONG 094 25 27W)	

GROUND-WATER-QUALITY DATA

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DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN)			TEMPERATURE (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARDNESS TOTAL (MG/L) (00900)	CALCIUM AS CACO3 (00900)	DIS- SOLVED (MG/L) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L) (00925)
				TO SAMPLING (72004)	PRIOR (MIN)	TEMPER- ATURE (DEG C) (00010)							
LINN COUNTY													
OCT 1989 06...	1015	111ALVM	2500		20	13.5	550	7.8	--	--	--	--	
1964CEDAR RAPIDS W3 (LAT 42 00 25N LONG 091 41 46W)													
OCT 1989 06...	1120	344SOLN	105		60	11.5	625	7.4	--	--	--	--	
415510091464801 08208W16ABABD FAIRFAX 2 (LAT 41 55 10N LONG 091 46 48W)													
JUL 1990 17...	1215	340DVSL	E130		E15	12.0	890	7.5	300	69	32		
423002091405101 08407W32DACP 1976HIAWATHA 4 (LAT 42 30 02N LONG 091 40 51W)													
JUL 1990 17...	1400	350SLRN	--		120	11.0	675	6.4	310	94	18		
421646091315102 08606W10BADB 1910COGGON 2 (LAT 42 16 46N LONG 091 31 51W)													
JUL 1990 18...	0905	350SLRN	65		10	11.0	745	7.3	360	97	29		
420901091373501 08507W26AB 13909 1961ALBURNETT 1 (LAT 42 09 01N LONG 091 37 35W)													
JUL 1990 18...	0945	358ALXD	290		15	12.0	530	7.3	--	--	--	--	
420200081363002 08307W01BAAA 05741 1953MARION 2 (LAT 42 02 05N LONG 091 36 34W)													
AUG 1990 30...	1500	355NIGR	335		120	12.5	560	7.6	280	76	22		
411652091212801 07504W19 LOUISA COUNTY COLUMBUS JUNCTION 89-1 (LAT 41 16 52N LONG 091 21 28W)													
AUG 1990 30...	1115	112PLSC	E280		E45	12.5	850	7.3	350	86	32		
411539091221701 0750536AC COLUMBUS CITY 3 (LAT 41 15 39N LONG 091 22 17W)													
AUG 1990 30...	1300	112PLSC	E15		E45	12.5	811	7.4	210	57	17		
411644091110702 07503W22DCBD 18800 1976GRANDVIEW 2 (LAT 41 16 44N LONG 091 11 07W)													
AUG 1990 30...	1430	112AFNN	35		45	12.5	443	7.1	330	73	35		
411053091111601 07403W27 1984WAPELLO 3 (5) (LAT 41 10 53N LONG 091 11 16W)													
AUG 1990 30...	1645	112PLSC	260		60	12.5	402	7.6	190	52	14		
432029095593401 09844W01BDBB LYON COUNTY 1955GEORGE 3 (LAT 43 20 29N LONG 095 59 34W)													
JUL 1990 17...	1330	111ALVM	145		20	10.0	875	7.3	--	--	--	--	
432030096175401 09846W05AAC 1979ALVORD 3 (LAT 43 20 30N LONG 096 17 54W)													
JUL 1990 17...	1450	111ALVM	80		20	9.0	1100	7.4	--	--	--	--	

GROUND-WATER-QUALITY DATA

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB CACO3) (90410)	CHLO- RIDE, SOLVED (MG/L AS CL) (00940)	SULFATE DTS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SI2O2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (MG/L AS) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
	LINN COUNTY 420025091414601 08307W17BBBB 1964CEDAR RAPIDS W3 (LAT 42 00 25N LONG 091 41 46W)									
OCT 1989 06...	--	--	--	--	--	--	--	--	0.100	2.50
	421138091471801 08508W09BAB 18947 1966CENTER POINT 1 (LAT 42 11 38N LONG 091 47 18W)									
OCT 1989 06...	--	--	--	--	--	--	--	--	2.50	0.200
	415510091464801 08208W16ABABD 1976FAIRFAX 2 (LAT 41 55 10N LONG 091 46 48W)									
JUL 1990 17...	46	4.6	--	2.5	130	0.50	12	492	<0.100	4.20
	423002091405101 08407W32DACB 1976HIAWATHA 4 (LAT 42 30 02N LONG 091 40 51W)									
JUL 1990 17...	8.0	1.5	--	24	48	20	51	268	4.60	<0.100
	421646091315102 08606W10BADB 1981COGGON 2 (LAT 42 16 46N LONG 091 31 51W)									
JUL 1990 18...	10	1.9	284	23	55	0.15	15	388	3.70	<0.100
	420901091373501 08507W26AB 13909 1961ALBURNETT 1 (LAT 42 09 01N LONG 091 37 35W)									
JUL 1990 18...	--	--	--	--	--	--	--	--	0.600	<0.100
	420200091363002 08307W01BAAA 05741 1953MARION 2 (LAT 42 02 05N LONG 091 36 34W)									
AUG 1990 30...	6.8	1.2	242	9.0	45	0.15	11	316	<0.100	<0.100
	411652091212801 07504W19 1981LOUISA COUNTY COLUMBUS JUNCTION 89-1 (LAT 41 16 52N LONG 091 21 28W)									
AUG 1990 30...	42	2.9	401	34	58	0.25	18	482	<0.100	1.20
	411539091221701 0750536AC 1982COLUMBUS CITY 3 (LAT 41 15 39N LONG 091 22 17W)									
AUG 1990 30...	7.9	1.1	229	0.50	6.6	0.25	23	256	<0.100	0.700
	411644091110702 07503W22DCBD 18800 1976GRANDVIEW 2 (LAT 41 16 44N LONG 091 11 07W)									
AUG 1990 30...	6.5	1.8	265	12	49	0.10	10	378	6.00	<0.100
	411053091111601 07403W27 1984WAPELLO 3 (5) (LAT 41 10 53N LONG 091 11 16W)									
AUG 1990 30...	6.6	1.2	152	5.5	49	0.10	19	242	<0.100	0.100
	432029095593401 09844W01BDBB 1985LYON COUNTY 1955GEORGE 3 (LAT 43 20 29N LONG 095 59 34W)									
JUL 1990 17...	--	--	--	--	--	--	--	--	9.80	<0.100
	432030096175401 09846W05AAC 1979ALVORD 3 (LAT 43 20 30N LONG 096 17 54W)									
JUL 1990 17...	--	--	--	--	--	--	--	--	0.900	<0.100

GROUND-WATER-QUALITY DATA

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DATE	PHOS-	IRON,	MANGA-	METRI-			METOLA-		TRI-				
	PHORUS ORTHO, DIS- SOLVED (MG/L AS P)	DIS- SOLVED (UG/L AS FE)	NESE, DIS- SOLVED (UG/L AS MN)	ATRA- ZINE, TOTAL (UG/L)	CYAN- AZINE TOTAL (UG/L)	BUZIN WHOLE (UG/L)	ALA- IN TOTAL (UG/L)	CHLOR WHOLE RECOVER (UG/L)	CHLOR IN WATER (UG/L)	FLURA- LIN BUTY- LATE RECOVER (UG/L)			
	(00671)	(01046)	(01056)	[Pesticide concentration expressed as total recoverable]			(39630)	(81757)	(81408)	(77825)	(39356)	(99901)	(39030)

LINN COUNTY
420025091414601 08307W17BBBB 1964CEDAR RAPIDS W3 (LAT 42 00 25N LONG 091 41 46W)

OCT 1989 06... 0.200 -- -- -- -- -- -- -- -- -- -- --

421138091471801 08508W09BAB 18947 1966CENTER POINT 1 (LAT 42 11 38N LONG 091 47 18W)

OCT 1989 06... <0.100 -- -- 0.16 <0.10 <0.10 <0.10 <0.10 <0.10 -- <0.10

415510091464801 08208W16ABABD FAIRFAX 2 (LAT 41 55 10N LONG 091 46 48W)

JUL 1990 17... <0.100 140 <20 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

423002091405101 08407W32DACP 1976HIAWATHA 4 (LAT 42 30 02N LONG 091 40 51W)

JUL 1990 17... <0.100 <20 <20 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

421646091315102 08606W10BADB 1910COGGON 2 (LAT 42 16 46N LONG 091 31 51W)

JUL 1990 18... <0.100 <20 <20 4.3 0.10 <0.10 3.30 0.42 <0.10 <0.10 <0.10

420901091373501 08507W26AB 13909 1961ALBURNETT 1 (LAT 42 09 01N LONG 091 37 35W)

JUL 1990 18... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

420200091363002 08307W01BAAA 05741 1953MARION 2 (LAT 42 02 05N LONG 091 36 34W)

AUG 1990 30... <0.100 340 <20 -- -- -- -- -- -- -- -- --

LOUISA COUNTY
411652091212801 07504W19 COLUMBUS JUNCTION 89-1 (LAT 41 16 52N LONG 091 21 28W)

AUG 1990 30... <0.100 3500 60 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

411539091221701 0750536AC COLUMBUS CITY 3 (LAT 41 15 39N LONG 091 22 17W)

AUG 1990 30... 0.100 1600 70 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

411644091110702 07503W22DCBD 18800 1976GRANDVIEW 2 (LAT 41 16 44N LONG 091 11 07W)

AUG 1990 30... <0.100 <20 <20 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

411053091111601 07403W27 1984WAPELLO 3 (5) (LAT 41 10 53N LONG 091 11 16W)

AUG 1990 30... <0.100 1100 190 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

LYON COUNTY
432029095593401 09844W01BDBB 1955GEORGE 3 (LAT 43 20 29N LONG 095 59 34W)

JUL 1990 17... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

432030096175401 09846W05AAC 1979ALVORD 3 (LAT 43 20 30N LONG 096 17 54W)

JUL 1990 17... <0.100 -- -- 0.53 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

GROUND-WATER-QUALITY DATA

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN) (72004)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO ₃) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
LYON COUNTY										
432616096101101 10045W33CACB				25301 1978ROCK RAPIDS	11	(LAT 43 26 16N LONG 096 10 11W)				
JUL 1990 17...	1550	111ALVM	50	20	9.0	1060	7.3	520	130	47
432608096201501 10047W36DCBD				1968LESTER 2 (LAT 43 26 08N LONG 096 20 15W)						
JUL 1990 18...	0730	111ALVM	50	30	11.0	1200	7.4	630	170	51
431646096142901 09816W26ACDD				1976DOON 4 (LAT 43 16 46N LONG 096 14 29W)						
SEP 1990 19...	0745	111ALVM	375	30	10.0	880	7.3	--	--	--
412924094072201 X				MADISON COUNTY EARLHAM 4 (LAT 41 29 24N LONG 094 07 22W)						
AUG 1990 08...	0830	111ALVM	E120	E45	12.0	720	7.2	410	120	26
411726093503201 07526W15CCDA				1979SAINT CHARLES 3 (LAT 41 17 26N LONG 093 50 32W)						
AUG 1990 15...	0630	111ALVM	80	20	13.0	512	6.6	--	--	--
412115092391201 07616W25CACD				MAHASKA COUNTY 1980OSKALOOSA 26 (LAT 41 21 15N LONG 092 39 12W)						
AUG 1990 15...	0900	111ALVM	275	60	15.0	589	7.3	320	84	26
412938092380601 07715W07BAAC				18239 1966NEW SHARON 2 (LAT 41 29 38N LONG 092 38 06W)						
AUG 1990 15...	1100	111ALVM	140	60	11.0	617	7.0	350	98	25
411855092552101 07518W10BDCA				MARION COUNTY 1977HARVEY 1 (LAT 41 18 55N LONG 092 55 21W)						
AUG 1990 16...	1215	111ALVM	130	45	12.0	1190	7.3	--	--	--
420613092593601 08418W07BACA				MARSHALL COUNTY 1969ALBION 2 (LAT 42 06 13N LONG 092 59 36W)						
OCT 1989 06...	1100	111ALVM	--	30	12.5	735	7.1	--	--	--
420020092465001 08317W13BA				07265 1955LE GRAND 2 (LAT 42 00 20N LONG 092 46 50W)						
OCT 1989 06...	1500	339PPCH	75	30	13.0	680	7.5	--	--	--
420405092545601 08418W23CAC				MARSHALLTOWN 8 (LAT 42 04 05N LONG 092 54 56W)						
JUL 1990 19...	1110	112PLSC	E900	E48	10.5	760	6.7	360	90	34
420414092550801 08418W23CBA				MARSHALLTOWN 10 (LAT 42 04 14N LONG 092 55 08W)						
JUL 1990 19...	1130	111ALVM	--	15	10.0	600	7.2	290	82	21
410656095380201 07342W23AAAC				MILLS COUNTY SILVER CITY 3 (LAT 41 06 56N LONG 095 38 02W)						
JUL 1990 20...	0925	111ALVM	E60	E40	11.0	1010	6.9	450	120	37

GROUND-WATER-QUALITY DATA

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DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L SIO2) (00955)	SOLIDs, RESIDUE AT 180 DEG. C (MG/L (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	
LYON COUNTY											
JUL 1990 17...	23	3.6	388	47	--	0.35	30	680	0.400	1.10	
	432616096101101	10045W33CACB	25301	1978ROCK RAPIDS	11	(LAT 43 26 16N LONG 096 10 11W)					
JUL 1990 18...	25	2.4	310	21	--	0.45	18	844	<0.100	0.200	
	432608096201501	10047W36DCBD		1968LESTER 2	(LAT 43 26 08N LONG 096 20 15W)						
SEP 1990 19...	--	--	--	--	--	--	--	--	6.80	<0.100	
	431646096142901	09816W26ACDD		1976DOON 4	(LAT 43 16 46N LONG 096 14 29W)						
AUG 1990 08...	--	--	--	--	--	--	--	--			
	412924094072201	X		MADISON COUNTY EARLHAM 4	(LAT 41 29 24N LONG 094 07 22W)						
AUG 1990 08...	5.4	1.7	330	8.5	--	0.20	21	453	0.200	<0.100	
	411726093503201	07526W15CCDA		1979SAINT CHARLES 3	(LAT 41 17 26N LONG 093 50 32W)						
AUG 1990 15...	--	--	--	--	--	--	--	--	0.100	0.900	
	412115092391201	07616W25CACD		MAHASKA COUNTY 1980OSKALOOSA 26	(LAT 41 21 15N LONG 092 39 12W)						
AUG 1990 15...	12	3.5	218	21	70	0.35	15	358	1.10	<0.100	
	412938092380601	07715W07BAAC	18239	1966NEW SHARON 2	(LAT 41 29 38N LONG 092 38 06W)						
AUG 1990 15...	10	1.1	289	4.5	56	0.35	20	350	<0.100	0.500	
	411855092552101	07518W10BDCA		MARION COUNTY 1977HARVEY 1	(LAT 41 18 55N LONG 092 55 21W)						
AUG 1990 16...	--	--	--	--	--	--	--	--	<0.100	<0.100	
	420613092593601	08418W07BACA		MARSHALL COUNTY 1969ALBION 2	(LAT 42 06 13N LONG 092 59 36W)						
OCT 1989 06...	--	--	--	--	--	--	--	--	2.70	<0.100	
	420020092465001	08317W13BA	07265	1955LE GRAND 2	(LAT 42 00 20N LONG 092 46 50W)						
OCT 1989 06...	--	--	--	--	--	--	--	--	6.40	<0.100	
	420405092545601	08418W23CAC		MARSHALLTOWN 8	(LAT 42 04 05N LONG 092 54 56W)						
JUL 1990 19...	17	2.5	298	19	87	0.40	17	402	<0.100	1.20	
	420414092550801	08418W23CBA		MARSHALLTOWN 10	(LAT 42 04 14N LONG 092 55 08W)						
JUL 1990 19...	6.5	2.0	181	11	77	0.15	19	328	4.60	<0.100	
	410656095380201	07342W23AAAC		MILLS COUNTY SILVER CITY 3	(LAT 41 06 56N LONG 095 38 02W)						
JUL 1990 20...	20	2.8	275	87	--	0.25	25	630	0.100	0.200	

GROUND-WATER-QUALITY DATA

DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P)	IRON, DIS- SOLVED (UG/L AS FE)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	ATRA- ZINE, TOTAL (UG/L)	CYAN- AZINE, TOTAL (UG/L)	METRI- BUZIN IN WHOLE WATER (UG/L)	ALA- CHLOR IN TOTAL RECOVER (UG/L)	METOLA- CHLOR IN WHOLE WATER (UG/L)	BUTY- LATE RECOVER (UG/L)	TRI- FLURA- LIN TOTAL (UG/L)
	(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	(99001)	(39030)
	[Pesticide concentration expressed as total recoverable]									

GROUND-WATER-QUALITY DATA

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DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN)	TEMPER- ATURE WATER (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L) (00900)	CALCIUM AS CACO3 (00900)	MAGNE- SIUM, DIS- SOLVED (MG/L) (00915)
MILLS COUNTY										
JUL 1990 20...	1055	111ALVM	145	25	12.0	700	6.8	350	91	29
1978MALVERN 11 (LAT 41 00 07N LONG 095 33 05W)										
JUL 1990 20...	1150	111ALVM	80	30	12.0	580	7.0	280	72	24
1965HASTINGS 1 (LAT 41 01 07N LONG 095 30 00W)										
JUL 1990 20...	1300	112PLSC	135	30	13.0	672	7.0	330	89	26
1959EMERSON 3 (LAT 41 01 08N LONG 095 24 19W)										
SEP 1990 06...	0900	111ALVM	22	240	12.0	711	6.5	340	90	28
MITCHELL COUNTY										
	431654092484501	09817W26ADBC		16641	1964OSAGE 5 (LAT 43 16 44N LONG 092 48 38W)					
JUL 1990 23...	1630	364GLEN	750	15	13.0	420	7.1	280	75	23
MONONA COUNTY										
	420245095422001	08442W35BCD		04159	1949UTE 2 (LAT 42 02 45N LONG 095 42 20W)					
JUL 1990 25...	1030	111ALVM	83	25	14.0	900	7.1	500	130	43
1967MAPLETON 4 (LAT 42 10 04N LONG 095 47 48W)										
JUL 1990 25...	1450	111MPRV	400	20	11.0	820	7.3	--	--	--
1963CASTANA 2 (LAT 42 04 20N LONG 095 54 57W)										
AUG 1990 17...	0900	111ALVM	50	20	10.5	960	7.1	--	--	--
1974WHITING 3 (LAT 42 07 35N LONG 096 08 57W)										
AUG 1990 22...	1330	111ALVM	140	30	11.0	1030	7.2	--	--	--
1964ONAWA 5 (LAT 42 01 40N LONG 096 05 40W)										
AUG 1990 22...	1500	111ALVM	600	20	12.0	868	7.3	--	--	--
1957MOORHEAD 2 (LAT 41 55 18N LONG 095 51 00W)										
AUG 1990 23...	1330	112PLSC	--	20	13.0	849	7.2	--	--	--
1973BLENCOE 2 (LAT 41 55 58N LONG 096 04 48W)										
AUG 1990 23...	1445	111ALVM	140	20	12.0	1140	7.2	--	--	--

GROUND-WATER-QUALITY DATA

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (MG/L AS (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	
MILLS COUNTY											
	410007095330501	07241W27CDCC				1978MALVERN 11	(LAT 41 00 07N LONG 095 33 05W)				
JUL 1990 20...	11	3.7	302		14	--	0.40	20	428	<0.100	0.700
	410107095300001	07241W24DAD				1965HASTINGS 1	(LAT 41 01 07N LONG 095 30 00W)				
JUL 1990 20...	15	1.7	192		13	--	0.25	22	348	5.50	<0.100
	410108095241901	07240W23DDAC				1959EMERSON 3	(LAT 41 01 08N LONG 095 24 19W)				
JUL 1990 20...	13	1.6	186		20	--	0.20	28	416	19.0	<0.100
	410830095253801	07340W10ACAA				1978HENDERSON 2	(LAT 41 08 30N LONG 095 25 38W)				
SEP 1990 06...	13	2.3	306		5.0	--	0.45	24	428	1.70	<0.100
\	431654092484501	09817W26ADBC			16641 1964OSAGE 5	(LAT 43 16 44N LONG 092 48 38W)					
JUL 1990 23...	7.1	2.0	250		7.5	44	0.35	12	304	<0.100	0.400
	420245095422001	08442W35BCD			MONONA COUNTY 04159 1949UTE 2	(LAT 42 02 45N LONG 095 42 20W)					
JUL 1990 25...	8.9	6.3	364		38	--	0.30	31	630	12.0	<0.100
	420950095480201	08543W24BAAA				1967MAPLETON 4	(LAT 42 10 04N LONG 095 47 48W)				
JUL 1990 25...	--	--	--		--	--	--	--	--	11.0	<0.100
	420420095545702	08444W24CAAC				1963CASTANA 2	(LAT 42 04 20N LONG 095 54 57W)				
AUG 1990 17...	--	--	--		--	--	--	--	--	14.0	<0.100
	420735096085701	08446W01BABC				1974WHITING 3	(LAT 42 07 35N LONG 096 08 57W)				
AUG 1990 22...	--	--	--		--	--	--	--	--	<0.100	0.700
	420140096054001	08345W04CBDB				1964ONAWA 5	(LAT 42 01 40N LONG 096 05 40W)				
AUG 1990 22...	--	--	--		--	--	--	--	--	<0.100	0.600
	415518095510002	08243W09DDCD				1957MOORHEAD 2	(LAT 41 55 18N LONG 095 51 00W)				
AUG 1990 23...	--	--	--		--	--	--	--	--	7.80	<0.100
	415558096044801	08245W09ADAD				1973BLENCOE 2	(LAT 41 55 58N LONG 096 04 48W)				
AUG 1990 23...	--	--	--		--	--	--	--	--	<0.100	1.20

GROUND-WATER-QUALITY DATA

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PHOS- PHORUS	MANGA- NESE,	METRI- BUZIN	METOLA- CHLOR	TRI- FLURA-					
ORTHO, DIS- SOLVED (MG/L AS P)	IRON, DIS- SOLVED (UG/L AS FE)	DIS- SOLVED (UG/L AS MN)	CYAN- AZINE (UG/L) (UG/L)	IN WHOLE TOTAL (UG/L)	ALA- CHLOR TOTAL (UG/L)	IN WHOLE TOTAL (UG/L)	BUTY- LATE WATER (UG/L)	TOTAL RECOVER (UG/L)	
DATE	[Pesticide concentration expressed as total recoverable]								
(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	(99901)	(39030)

GROUND-WATER-QUALITY DATA

DATE	GROSS ALPHA, DIS- SOLVED (PCI/L U-NAT) (01515)	GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515)
	AS	AS

410007095330501 07241W27CDCC	MILLS COUNTY 1978MALVERN 11 (LAT 41 00 07N LONG 095 33 05W)	
	JUL 1990 20...	-- --
410107095300001 07241W24DAD	1965HASTINGS 1 (LAT 41 01 07N LONG 095 30 00W)	
	JUL 1990 20...	-- --
410108095241901 07240W23DDAC	1959EMERSON 3 (LAT 41 01 08N LONG 095 24 19W)	
	JUL 1990 20...	-- --
410830095253801 07340W10ACAA	1978HENDERSON 2 (LAT 41 08 30N LONG 095 25 38W)	
	SEP 1990 06...	-- --
431654092484501 09817W26ADBC	MITCHELL COUNTY 16641 1964OSAGE 5 (LAT 43 16 44N LONG 092 48 38W)	
	JUL 1990 23...	<1.5 5.0
420245095422001 08442W35BCD	MONONA COUNTY 04159 1949UTE 2 (LAT 42 02 45N LONG 095 42 20W)	
	JUL 1990 25...	-- --
420950095480201 08543W24BAAA	1967MAPLETON 4 (LAT 42 10 04N LONG 095 47 48W)	
	JUL 1990 25...	-- --
420420095545702 08444W24CAAC	1963CASTANA 2 (LAT 42 04 20N LONG 095 54 57W)	
	AUG 1990 17...	-- --
420735096085701 08446W01BABC	1974WHITING 3 (LAT 42 07 35N LONG 096 08 57W)	
	AUG 1990 22...	-- --
420140096054001 08345W04CBDB	1964ONAWA 5 (LAT 42 01 40N LONG 096 05 40W)	
	AUG 1990 22...	-- --
415518095510002 08243W09DDCD	1957MOORHEAD 2 (LAT 41 55 18N LONG 095 51 00W)	
	AUG 1990 23...	-- --
415558096044801 08245W09ADAD	1973BLENCOE 2 (LAT 41 55 58N LONG 096 04 48W)	
	AUG 1990 23...	-- --

GROUND-WATER-QUALITY DATA

397

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN)	TEMPER- ATURE (DEG C) (00010)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	HARD- NESS TOTAL (MG/L) (00900)	CALCIUM AS CACO3 (00900)	MAGNE- SIUM, DIS- SOLVED (MG/L) (00915)
MONTGOMERY COUNTY										
	410216095113401	07238W14CBBB	07047 1955RED OAK 4	(LAT 41 02 16N LONG 095 11 34W)						
JUL 1990 18...	1630	217DKOT	360	1440	12.0	392	6.4	180	50	14
	415613094591201	07136W21DAAB		1981VILLISCA 10	(LAT 41 56 13N LONG 094 59 12W)					
AUG 1990 16...	1215	111ALVM	65	60	12.0	702	6.8	330	88	27
	412321091034801	07602W15AACB		MUSCATINE COUNTY 1958MUSCATINE 5	(LAT 41 23 21N LONG 091 03 48W)					
AUG 1990 31...	1330	111ALVM	550	700	14.0	555	7.1	--	--	--
	431203095513001	08742W18CCDC		O'BRIEN COUNTY 1979SHELDON 10	(LAT 43 12 03N LONG 095 51 30W)					
JUL 1990 18...	0950	111ALVM	50	20	13.5	800	7.3	--	--	--
	403906095015001	06737W01AAAA		PAGE COUNTY 1985SHAMBAUGH 3	(LAT 40 39 06N LONG 095 01 50W)					
JUL 1990 18...	1200	111ALVM	22	30	11.5	472	6.1	--	--	--
	404958095175601	07039W26CADDD		ESSEX 3	(LAT 40 49 58N LONG 095 17 56W)					
AUG 1990 31...	1050	111ALVM	E100	E50	13.0	463	7.3	220	54	20
	430546094411601	09633W36ABBC		PALO ALTO COUNTY 1979EMMETSBURG 4	(LAT 43 05 46N LONG 094 41 16W)					
JUL 1990 27...	1145	111ALVM	200	20	14.0	1130	7.1	440	120	34
	424948096332901	09348W31BDDC		PLYMOUTH COUNTY 1959AKRON 4	(LAT 42 49 48N LONG 096 33 29W)					
JUL 1990 17...	0830	111ALVM	320	20	11.0	880	7.2	--	--	--
	424921095581501	09243W06BABA		1956REMSEN 3	(LAT 42 49 21N LONG 095 58 15W)					
JUL 1990 18...	1540	111ALVM	90	20	10.5	915	7.4	--	--	--
	424911096033001	09244W05AA		1953OYENS 1	(LAT 42 49 11N LONG 096 03 30W)					
JUL 1990 18...	0845	217DKOT	100	5	14.0	650	7.4	--	--	--
	423531095593901	09044W24CC		1981KINGSLEY 3	(LAT 42 35 31N LONG 095 59 39W)					
JUL 1990 19...	1005	111ALVM	220	20	10.0	610	7.4	--	--	--
	424305096145301	09146W11BBDD	19911 1967MERRILL 3	(LAT 42 43 05N LONG 096 14 53W)						
AUG 1990 03...	1100	111ALVM	200	25	13.0	750	7.3	--	--	--
	424528096362501	09249W27DAAB		1980WESTFIELD 2	(LAT 42 45 28N LONG 096 36 25W)					
AUG 1990 13...	1645	111ALVM	100	25	11.0	1120	7.3	--	--	--

GROUND-WATER-QUALITY DATA

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS) SIO2)	SOLIDS, RESIDUE AT 180 DEG. C SIO2)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, DIS- SOLVED (MG/L AS N) (00608)
MONTGOMERY COUNTY										
JUL 1990 18...	8.7	1.2	184	4.0	--	0.25	21	212	2.70	<0.100
	410216095113401	07238W14CBBB	07047 1955RED OAK 4	(LAT 41 02 16N LONG 095 11 34W)						
AUG 1990 16...	22	1.3	173	43	--	0.20	20	440	2.40	0.300
	415613094591201	07136W21DAAB	1981VILLISCA 10	(LAT 41 56 13N LONG 094 59 12W)						
AUG 1990 31...	--	--	--	--	--	--	--	--	0.400	<0.100
	412321091034801	07602W15AACB	MUSCATINE COUNTY 1958MUSCATINE 5	(LAT 41 23 21N LONG 091 03 48W)						
JUL 1990 18...	--	--	--	--	--	--	--	--	0.100	<0.100
	431203095513001	09742W19CCDC	O'BRIEN COUNTY 1979SHELDON 10	(LAT 43 12 03N LONG 095 51 30W)						
JUL 1990 18...	--	--	--	--	--	--	--	--	0.100	<0.100
	403906095015001	06737W01AAAA	PAGE COUNTY 1985SHAMBAUGH 3	(LAT 40 39 06N LONG 095 01 50W)						
AUG 1990 31...	9.2	1.3	154	10	--	0.30	18	282	12.0	<0.100
	430546094411601	09633W36ABBC	PALO ALTO COUNTY 1979EMMETSBURG 4	(LAT 43 05 46N LONG 094 41 16W)						
JUL 1990 27...	190	9.7	287	330	110	<0.10	27	1060	0.300	0.510
	424948096332901	09348W31BDDC	PLYMOUTH COUNTY 1959AKRON 4	(LAT 42 49 48N LONG 096 33 29W)						
JUL 1990 17...	--	--	--	--	--	--	--	--	6.00	<0.100
	424921095581501	09243W06BABA	1956REMSEN 3	(LAT 42 49 21N LONG 095 58 15W)						
JUL 1990 18...	--	--	--	--	--	--	--	--	8.60	0.100
	424911096033001	09244W05AA	1953OYENS 1	(LAT 42 49 11N LONG 096 03 30W)						
JUL 1990 19...	--	--	--	--	--	--	--	--	0.100	0.100
	423531095593901	09044W24CC	1981KINGSLEY 3	(LAT 42 35 31N LONG 095 59 39W)						
JUL 1990 19...	--	--	--	--	--	--	--	--	3.10	<0.100
	424305096145301	09146W11BBDD	19911 1967MERRILL 3	(LAT 42 43 05N LONG 096 14 53W)						
AUG 1990 03...	--	--	--	--	--	--	--	--	6.40	<0.100
	424528096362501	09249W27DAAB	1980WESTFIELD 2	(LAT 42 45 28N LONG 096 36 25W)						
AUG 1990 13...	--	--	--	--	--	--	--	--	12.0	<0.100

GROUND-WATER-QUALITY DATA

399

DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P)	MANGA- NESE, DIS- SOLVED (UG/L AS FE)	METRI- BUZIN IN CHLOR TOTAL (UG/L)	METOLA- CHLOR IN TOTAL WATER RECOVER (UG/L)	TRI- FLURA- LIN TOTAL WATER LATE RECOVER (UG/L)
			[Pesticide concentration expressed as total recoverable]		
	(00671)	(01046)	(01056)	(39630) (81757) (81408) (77825) (39356)	(99901) (39030)

MONTGOMERY COUNTY
410216095113401 07238W14CBBB 07047 1955RED OAK 4 (LAT 41 02 16N LONG 095 11 34W)

415613094591201 07136W21DAAB 1981VILLISCA 10 (LAT 41 56 13N LONG 094 59 12W)

AUG 1990 16... <0.100 1600 740 0.30 <0.10 <0.10 0.11 <0.10 <0.10 <0.10 <0.10

412321091034801 07602W15AACB MUSCATINE COUNTY
1958MUSCATINE 5 (LAT 41 23 21N LONG 091 03 48W)

AUG 1990
31... <0.100 -- -- 0.13 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

431203095513001 09742W19CCDC O'BRIEN COUNTY
1979SHELDON 10 (LAT 43 12 03N LONG 095 51 30W)

JUL 1990 18... <0.100 -- -- 0.30 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

PAGE COUNTY
1985SHAMBAUGH 3 (LAT 40 39 06N LONG 095 01 50W)

JUL 1990
18... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

404958095175601 07039W26CADD
ESSEX 3 (LAT 40 49 58N LONG 095 17 56W)

30546094411601 09633W36ABBC FAIR ALTO COUNTY
1979EMMETSBURG 4 (LAT 43 05 46N LONG 094 41 16W)

27... <0.10 930 520 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

424948096332901 09348W31BDDC 1959AKRON 4 (LAT 42 49 48N LONG 096 33 29W)

17... <0.100 -- -- 1.3 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

424921095581501 09243W06BABA 1956REMSEN 3 (LAT 42 49 21N LONG 095 58 15W)

JUL 1990
18... <0.100 -- -- 0.66 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

424911096033001 09244W05AA 1953OYENS 1 (LAT 42 49 11N LONG 096 03 30W)

JUL 1990

424305096145301 09146W11BBDD 19911 1967MERRILL 3 (LAT 42 43 05N LONG 096 14 53W)
AUG 1990

≤ 0.100 -- -- 1.0 ≤ 0.10 ≤ 0.10 ≤ 0.10 ≤ 0.10 ≤ 0.10

424528096362501 09249W27DAAB 1980WESTFIELD 2 (LAT 42 45 28N LONG 096 36 25W)

0.200 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

GROUND-WATER-QUALITY DATA

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN)	TEMPERATURE WATER (DEG C)	SPECIFIC CONDUCTANCE (US/CM)	PH (STAND-ARD UNITS)	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
				(72004)	(00010)	(00095)	(00400)	(00900)	(00915)	(00925)
				POCAHONTAS COUNTY 1970PALMER 5 (LAT 42 37 50N LONG 094 35 58W)						
JUL 1990 24...	0950	112PLSC	87	20	12.0	1610	7.4	--	--	--
				423750094355804 09032W10AAAD						
				1960POCAHONTAS 4 (LAT 42 44 09N LONG 094 39 58W)						
JUL 1990 24...	1145	217DKOT	400	20	12.0	1480	7.1	750	180	73
				424409094395801 09232W31DCAB						
				024907094313001 09231W05AAC 02973 1947ROLFE 3 (LAT 42 49 07N LONG 094 31 30W)						
JUL 1990 24...	1310	330MSSP	45	20	12.0	990	7.0	--	--	--
				414051093190902 07921W05CAAA 09808 1958MITCHELLVILLE 2 (LAT 41 40 51N LONG 093 19 09W)						
OCT 1989 19...	0930	111ALVM	450	20	11.0	604	7.3	--	--	--
				413342093432801 07825W15CAAC 1954WEST DES MOINES 9 (LAT 41 33 42N LONG 093 43 28W)						
OCT 1989 19...	1330	111ALVM	80	20	14.0	737	7.1	--	--	--
				414051093190903 07921W05CAAA POLK COUNTY 1977MITCHELLVILLE 3 (LAT 41 40 51N LONG 093 19 09W)						
AUG 1990 14...	1330	111ALVM	250	30	12.5	708	7.3	--	--	--
				414409093241601 08022W15CBED 1981BONDURANT 3 (LAT 41 44 09N LONG 093 24 16W)						
AUG 1990 14...	1430	111ALVM	350	305	11.5	710	7.3	390	100	33
				414634093423601 08125W01BABA 1978POLK CITY 3 (LAT 41 46 34N LONG 093 42 36W)						
AUG 1990 14...	1530	112PLSC	200	15	14.0	748	7.5	370	97	31
				413350093432801 07825W15BDDC 1952WEST DES MOINES 8 (LAT 41 33 50N LONG 093 43 28W)						
AUG 1990 15...	0830	111ALVM	180	20	12.5	1020	7.1	540	140	46
				412328095411901 07642W09CCCC POTTAWATTAMIE COUNTY 1974UNDERWOOD 3 (LAT 41 23 28N LONG 095 41 19W)						
AUG 1990 08...	0840	112PLSC	75	30	10.5	570	7.3	--	--	--
				412655095365701 07742W24DDCC 1953NEOLA 1 (LAT 41 26 55N LONG 095 36 57W)						
AUG 1990 08...	1100	111ALVM	90	25	12.0	990	7.2	550	130	55
				412813095210901 07739W17ACDC 1975AVOCA 3 (LAT 41 28 13N LONG 095 21 09W)						
AUG 1990 08...	1345	111ALVM	100	720	12.0	810	7.1	390	110	27

GROUND-WATER-QUALITY DATA

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DATE	POTAS-	ALKA-	CHLO-	SULFATE	FLUO-	SILICA,	SOLIDS,	NITRO-	NITRO-	
	SODIUM,	SIUM,	LINITY	RIDE,	RIDE,	DIS-	AT 180	GEN,	GEN,	
	DIS-	DIS-	LAB	DIS-	DIS-	SOLVED	NO2+NO3	AMMONIA		
	SOLVED	SOLVED	(MG/L)	SOLVED	SOLVED	(MG/L)	DIS-	DIS-		
	(MG/L)	(MG/L)	AS	(MG/L)	(MG/L)	AS	SOLVED	(MG/L)	(MG/L)	
	AS NA)	AS K)	CACO3)	AS CL)	AS SO4)	AS F)	(MG/L)	AS N)	AS N)	
	(00930)	(00935)	(90410)	(00940)	(00945)	(00950)	(00955)	(70300)	(00631)	(00608)

423750094355804 09032W10AAAD POCOHONTAS COUNTY
1970PALMER 5 (LAT 42 37 50N LONG 094 35 58W)

JUL 1990 24... -- -- -- -- -- <0.100 2.60

424409094395801 09232W31DCAB 1960 POCOHONTAS 4 (LAT 42 44 09N LONG 094 39 58W)

JUL 1990 24... 68 4.2 402 2.5 580 -- 20 1150 <0.100 2.40

424907094313001 09231W05AAC 02973 1947ROLFE 3 (LAT 42 49 07N LONG 094 31 30W)

JUL 1990 24... -- -- -- -- -- -- -- -- -- 0.100 1.70

POLK COUNTY
414051093190902 07921W05CAAA 09808 1958MITCHELLVILLE 2 (LAT 41 40 51N LONG 093 19 09W)

OCT 1989 -- -- -- -- -- -- -- -- -- 3.20 <0.100
19... -- -- -- -- -- -- -- -- --

413342093432801 07825W15CAAC 1954WEST DES MOINES 9 (LAT 41 33 42N LONG 093 43 28W)

OCT 1989 19... -- -- -- -- -- -- -- -- -- 0.500 <0.100

POLK COUNTY
414051093190903 07921W05CAAA 1977MITCHELLVILLE 3 (LAT 41 40 51N LONG 093 19 09W)

AUG 1990 14... -- -- -- -- -- -- -- -- -- 5.70 <0.100

414409093241601 08022W15CBDCD 1981BONDURANT 3 (LAT 41 44 09N LONG 093 24 16W)

AUG 1990 14... 7.4 1.2 276 25 50 0.20 20 400 7.80 <0.100

414634093423601 08125W01BABA 1978POLK CITY 3 (LAT 41 46 34N LONG 093 42 36W)

AUG 1990 14... 9.7 1.4 329 16 55 0.20 26 394 <0.100 1.30

413350093432801 07825W15R0DDC 1952WEST DES MOINES 8 (LAT 41 33 50N LONG 093 43 28W)

AUG 1990 36 1-3 325 36 170 8-35 36 558 8-300 56-100

POTTAWATTAMIE COUNTY

412328095411901 07642W09CCCCC 1974UNDERWOOD S (LAT 41 23 28N LONG 095 41 19W)
AUG 1990

412655095365701 07742W24DDCC 1953NEOLA 1 (LAT 41 26 55N LONG 095 36 57W)

... 35 2.3 373 92 -- 0.30 25 /64 14.0

412813095210901 07739W17ACDC 1975AVOCA 3 (LAT 41 28 13N LONG 095 21 09W)

1990 9.1 3.1 289 15 -- 0.25 14 470 0.70

GROUND-WATER-QUALITY DATA

DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P)	IRON, DIS- SOLVED (UG/L AS FE)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	ATRA- ZINE, TOTAL (UG/L)	CYAN- AZINE, TOTAL (UG/L)	METRI- BUZIN IN	ALA- CHLOR TOTAL	METOLA- CHLOR IN	TRI- FLURA- LIN TOTAL RECOVER (UG/L)
									[Pesticide concentration expressed as total recoverable]
									(00671) (01046) (01056) (39630) (81757) (81408) (77825) (39356) (99901) (39030)

423750094355804 09032W10AAAD				POCAHONTAS COUNTY 1970PALMER 5 (LAT 42 37 50N LONG 094 35 58W)							
JUL 1990 24...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424409094395801 09232W31DCAB				1960POCAHONTAS 4 (LAT 42 44 09N LONG 094 39 58W)							
JUL 1990 24...	0.100	20	1200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424907094313001 09231W05AAC				02973 1947ROLFE 3 (LAT 42 49 07N LONG 094 31 30W)							
JUL 1990 24...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
POLK COUNTY											
414051093190902 07921W05CAAA				09808 1958MITCHELLVILLE 2 (LAT 41 40 51N LONG 093 19 09W)							
OCT 1989 19...	<0.100	--	--	<0.10	0.17	<0.10	<0.10	<0.10	<0.10	--	<0.10
413342093432801 07825W15CAAC				1954WEST DES MOINES 9 (LAT 41 33 42N LONG 093 43 28W)							
OCT 1989 19...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	<0.10
414051093190903 07921W05CAAA				1977MITCHELLVILLE 3 (LAT 41 40 51N LONG 093 19 09W)							
AUG 1990 14...	<0.100	--	--	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
414409093241601 08022W15CBED				1981BONDURANT 3 (LAT 41 44 09N LONG 093 24 16W)							
AUG 1990 14...	<0.100	380	50	0.18	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
414634093423601 08125W01BABA				1978POLK CITY 3 (LAT 41 46 34N LONG 093 42 36W)							
AUG 1990 14...	<0.100	2800	130	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
413350093432801 07825W15BDCC				1952WEST DES MOINES 8 (LAT 41 33 50N LONG 093 43 28W)							
AUG 1990 15...	<0.100	2500	530	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
412328095411901 07642W09CCCC				POTTAWATTAMIE COUNTY 1974UNDERWOOD 3 (LAT 41 23 28N LONG 095 41 19W)							
AUG 1990 08...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10
412655095365701 07742W24DDCC				1953NEOLA 1 (LAT 41 26 55N LONG 095 36 57W)							
AUG 1990 08...	<0.100	20	200	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10
412813095210901 07739W17ACDC				1975AVOCAL 3 (LAT 41 28 13N LONG 095 21 09W)							
AUG 1990 08...	<0.100	1800	1800	0.30	<0.10	<0.10	<0.10	<0.30	<0.10	<0.10	<0.10

GROUND-WATER-QUALITY DATA

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DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN)	TEMPERATURE WATER (DEG C)	SPECIFIC CONDUCTANCE (US/CM)	PH (STAND-ARD UNITS)	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNESIUM, DIS-SOLVED (MG/L AS MG)	
				(00058)	(72004)	(00010)	(00095)	(00400)	(00900)	(00915)	(00925)
POTTAWATTAMIE COUNTY											
AUG 1990 08...	1630	111ALVM	E20		E30	12.5	770	7.2	370	92	35
HANCOCK 5 (LAT 41 23 31N LONG 095 21 52W)											
4112331095215201 07639W08CCC											
1979 OAKLAND 11 (LAT 41 18 38N LONG 095 25 28W)											
AUG 1990 23...	1230	111ALVM	65		260	11.0	571	7.4	--	--	--
411201095252801 07440W22AACD											
1954 MACEDONIA 1 (LAT 41 12 01N LONG 095 25 28W)											
AUG 1990 23...	1330	111ALVM	40		30	12.0	650	7.3	--	--	--
412144095515501 07644W23DCDD											
1971 CRESCENT 1 (LAT 41 21 44N LONG 095 51 55W)											
SEP 1990 07...	0730	112PLSC	70		30	11.0	2000	7.7	--	--	--
404831094201102 06930W05BBCD											
RINGGOLD COUNTY 1978 DIAGONAL 5 (LAT 40 48 31N LONG 094 20 11W)											
AUG 1990 15...	1530	111ALVM	61		20	12.0	678	7.2	--	--	--
404835094240201 06931W03											
19438 1967 CLEARFIELD 1 (LAT 40 48 35N LONG 094 24 02W)											
SEP 1990 06...	1140	111ALVM	80		40	12.0	462	7.1	--	--	--
422449094595201 08836W26ABAD											
12685 1960 SAC CITY 2 (LAT 42 24 49N LONG 094 59 52W)											
JUL 1990 30...	1130	112PLSC	480		30	11.5	830	7.0	--	--	--
413500090462401 07802E06DCC											
18000 1966 WALCOTT 3 (LAT 41 35 00N LONG 090 46 24W)											
AUG 1990 31...	1500	355NIGR	250		60	11.5	648	7.0	330	79	32
413810095185401 07938W19BDBB											
SHELBY COUNTY 1981 HARLAN 27 (LAT 41 38 10N LONG 095 18 54W)											
OCT 1989 06...	1030	111ALVM	70		20	10.0	730	7.1	--	--	--
413048095260701 07840W34BDCC											
1954 SHELBY 3 (LAT 41 30 48N LONG 095 26 07W)											
AUG 1990 08...	1215	111ALVM	15		20	13.0	630	7.0	--	--	--
413437095034401 07837W11AAAB											
1967 ELK HORN 9 (LAT 41 34 37N LONG 095 03 44W)											
AUG 1990 09...	0900	111ALVM	15		20	10.5	590	7.2	260	66	24
414715095121801 08137W31BCAB											
1956 IRWIN 3 (LAT 41 47 15N LONG 095 12 18W)											
AUG 1990 09...	1220	111ALVM	80		20	10.0	880	7.3	450	120	37

GROUND-WATER-QUALITY DATA

GROUND-WATER-QUALITY DATA

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DATE	PHOS-	IRON,	MANGA-	METRI-				METOLA-	TRI-		
	PHORUS	DIS-	NESE,	BUZIN	ALA-	CHLOR	CHLOR	FLURA-	LIN		
	ORTHO,	SOLVED	DIS-	CYAN-	IN	TOTAL	WHOLE	LATE	TOTAL		
(MG/L)	(UG/L)	(UG/L)	(AS MN)	TOTAL	WATER	RECOVER	WATER	RECOVER	RECOVER		
(AS P)	AS FE)			(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)		
	(00671)	(01046)	(01056)	[Pesticide concentration expressed as total recoverable]	(39630)	(81757)	(81408)	(77825)	(39356)	(99901)	(39030)
AUG 1990 08...	412331095215201	07639W08CCC	POTTAWATTAMIE COUNTY HANCOCK 5 (LAT 41 23 31N LONG 095 21 52W)	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	
AUG 1990 23...	411838095252801	07540W10DAAB	1978OAKLAND 11 (LAT 41 18 38N LONG 095 25 28W)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
AUG 1990 23...	411201095252801	07440W22AACD	1954MACEDONIA 1 (LAT 41 12 01N LONG 095 25 28W)	0.14	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
AUG 1990 15...	412144095515501	07644W23DCDD	1971CRESCENT 1 (LAT 41 21 44N LONG 095 51 55W)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
SEP 1990 07...	404831094201102	06930W05BBCD	RINGGOLD COUNTY 1978DIAGONAL 5 (LAT 40 48 31N LONG 094 20 11W)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
AUG 1990 15...	404835094240201	06931W03	19438 1967CLEARFIELD 1 (LAT 40 48 35N LONG 094 24 02W)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
SEP 1990 06...	422449094595201	08836W26ABAD	SAC COUNTY 1960SAC CITY 2 (LAT 42 24 49N LONG 094 59 52W)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
JUL 1990 30...	413500090462401	07802E06DCC	SCOTT COUNTY 18000 1966WALCOTT 3 (LAT 41 35 00N LONG 090 46 24W)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
AUG 1990 31...	413810095185401	07938W19BDBB	SHELBY COUNTY 1981HARLAN 27 (LAT 41 38 10N LONG 095 18 54W)	<0.10	<0.10	<0.10	<0.10	0.16	--	<0.10	
OCT 1989 06...	413048095260701	07840W34BDGD	1954SHELBY 3 (LAT 41 30 48N LONG 095 26 07W)	0.29	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	
AUG 1990 08...	413437095034401	07837W11AAAB	1967ELK HORN 9 (LAT 41 34 37N LONG 095 03 44W)	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	
AUG 1990 09...	414715095121801	08137W31BCAB	1956IRWIN 3 (LAT 41 47 15N LONG 095 12 18W)	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	
AUG 1990 09...	<0.100	12000	610	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	
	490	320		<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	

GROUND-WATER-QUALITY DATA

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN)	TEMPERATURE WATER (DEG C)	SPECIFIC CONDUCTANCE (US/CM)	PH (STAND-ARD UNITS)	HARDNESS TOTAL (MG/L AS CACO ₃)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)
				(72004)	(00010)	(00095)		(00400)	(00900)	(00915)
				SHELBY COUNTY 1981DEFIANCE 4 (LAT 41 49 32N LONG 095 20 19W)						
AUG 1990 09...	1500	111ALVM	22	20	11.0	860	7.3	--	--	--
				1968EARLING 2 (LAT 41 46 25N LONG 095 24 55W)						
AUG 1990 09...	1630	112PLSC	15	30	12.0	970	7.1	460	120	39
				1968PANAMA 3 (LAT 41 43 50N LONG 095 28 31W)						
AUG 1990 10...	0800	111ALVM	17	20	10.5	900	7.1	--	--	--
				SIOUX COUNTY 1960HAWARDEN 6 (LAT 42 59 46N LONG 096 29 29W)						
JUL 1990 17...	1000	111ALVM	100	20	13.0	1010	7.2	--	--	--
				1960SIOUX CENTER 5 (LAT 43 04 59N LONG 096 06 19W)						
JUL 1990 17...	1130	111ALVM	120	20	14.0	1270	7.2	--	--	--
				1977BOYDEN 3 (LAT 43 15 06N LONG 096 00 08W)						
AUG 1990 02...	1020	111ALVM	150	20	15.5	800	7.4	--	--	--
				STORY COUNTY 01501 1940ROLAND 2 (LAT 42 10 07N LONG 093 29 02W)						
AUG 1990 09...	1100	330MSSP	200	--	12.5	690	6.9	370	85	39
				420936093175201 08521W21ACCA 10677 1959ZEARING 2 (LAT 42 09 36N LONG 093 17 52W)						
AUG 1990 09...	1300	112PLSC	100	60	13.0	585	7.2	330	79	32
				420130093380901 08324W03CDBB 1982AMES 17 (LAT 42 01 30N LONG 093 38 09W)						
AUG 1990 09...	1545	112PLSC	600	1440	14.0	830	7.0	460	120	39
				415307093234701 08222W27BDD 03694 1946MAXWELL 2 (LAT 41 53 07N LONG 093 23 47W)						
AUG 1990 13...	1220	112PLSC	100	20	14.0	760	7.2	350	94	29
				TAMA COUNTY 1970MONTOUR 2 (LAT 41 58 52N LONG 092 42 49W)						
OCT 1989 06...	1400	112PLSC	45	30	13.0	625	7.3	--	--	--
				415502092240105 08213W18AAC 1963CHELSEA 1 (LAT 41 55 02N LONG 092 24 01W)						
JUL 1990 19...	1420	111ALVM	50	15	12.0	525	7.2	--	--	--
				404501094444901 06934W27ACBC TAYLOR COUNTY 1970GRAVITY 3 (LAT 40 45 01N LONG 094 44 49W)						
AUG 1990 16...	0830	111ALVM	10	120	12.0	542	7.2	--	--	--

GROUND-WATER-QUALITY DATA

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DATE	POTAS-	ALKA-	CHLO-	SULFATE	FLUO-	SILICA,	SOLIDS,	NITRO-	NITRO-
	SODIUM, DIS- SOLVED	SIUM, DIS- SOLVED	LINITY LAB	RIDE, DIS- SOLVED	RIDE, DIS- SOLVED	RIDE, DIS- SOLVED	(MG/L)	RESIDUE AT 180 DEG. C	GEN, NO2+NO3
	(MG/L)	(MG/L)	AS	(MG/L)	(MG/L)	AS	SOLVED	(MG/L)	(MG/L)
	AS NA)	AS K)	CACO3)	AS CL)	AS SO4)	AS F)	SIO2)	(MG/L)	AS N)
(00930)	(00935)	(90410)	(00940)	(00945)	(00950)	(00955)	(70300)	(00631)	(00608)

414932095201902 08139W13CACB				SHELBY COUNTY 1981DEFIANCE 4 (LAT 41 49 32N LONG 095 20 19W)							
AUG 1990 09...	--	--	--	--	--	--	--	--	--	<0.100	0.400
	414625095245501 08039W05BACD				1968EARLING 2 (LAT 41 46 25N LONG 095 24 55W)						
AUG 1990 09...	18	1.8	293	58	--	0.40	28	548	2.80	0.400	
	414350095283101 08040W23BBDA				1968PANAMA 3 (LAT 41 43 50N LONG 095 28 31W)						
AUG 1990 10...	--	--	--	--	--	--	--	--	--	<0.100	1.20
	425946096292901 09448W03AAAB				SIOUX COUNTY 1960HAWARDEN 6 (LAT 42 59 46N LONG 096 29 29W)						
JUL 1990 17...	--	--	--	--	--	--	--	--	--	7.10	<0.100
	430459096061901 09545W01ABBC				1960SIOUX CENTER 5 (LAT 43 04 59N LONG 096 06 19W)						
JUL 1990 17...	--	--	--	--	--	--	--	--	--	2.80	<0.100
	431506096000801 09744W02ADDC				1977BOYDEN 3 (LAT 43 15 06N LONG 096 00 08W)						
AUG 1990 02...	--	--	--	--	--	--	--	--	--	<0.100	0.300
	421007093290201 08523W14DDA	01501			STORY COUNTY 1940ROLAND 2 (LAT 42 10 07N LONG 093 29 02W)						
AUG 1990 09...	11	3.5	337	17	59	0.90	12	414	0.100	0.700	
	420936093175201 08521W21ACCA	10677			1959ZEARING 2 (LAT 42 09 36N LONG 093 17 52W)						
AUG 1990 09...	18	3.8	398	0.50	14	0.50	25	388	<0.100	3.20	
	420130093380901 08324W03CDBB				1982AMES 17 (LAT 42 01 30N LONG 093 38 09W)						
AUG 1990 09...	18	1.7	311	40	120	0.30	22	532	<0.100	0.200	
	415307093234701 08222W27BDD	03694			1946MAXWELL 2 (LAT 41 53 07N LONG 093 23 47W)						
AUG 1990 13...	22	3.0	338	14	45	0.45	15	412	<0.100	3.00	
	415852092424901 08316W21DCAB				TAMA COUNTY 1970MONTOUR 2 (LAT 41 58 52N LONG 092 42 49W)						
OCT 1989 06...	--	--	--	--	--	--	--	--	--	4.80	<0.100
	415502092240105 08213W18AAC				1963CHELSEA 1 (LAT 41 55 02N LONG 092 24 01W)						
JUL 1990 19...	--	--	--	--	--	--	--	--	--	0.800	<0.100
	404501094444901 06934W27ACBC				TAYLOR COUNTY 1970GRAVITY 3 (LAT 40 45 01N LONG 094 44 49W)						
AUG 1990 16...	--	--	--	--	--	--	--	--	--	0.600	<0.100

GROUND-WATER-QUALITY DATA

DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P)	IRON, DIS- SOLVED (UG/L AS FE)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	ATRA- ZINE, TOTAL (UG/L)	CYAN- AZINE TOTAL (UG/L)	METRI- BUZIN IN WHOLE WATER (UG/L)	ALA- CHLOR IN TOTAL RECOVER (UG/L)	METOLA- CHLOR IN WHOLE WATER (UG/L)	TRI- FLURA- LIN TOTAL BUTY- LATE RECOVER (UG/L)	
	[Pesticide concentration expressed as total recoverable]									
	(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	(99901)	(39030)

GROUND-WATER-QUALITY DATA

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GROUND-WATER-QUALITY DATA

DATE	SODIUM, DIS- SOLVED (MG/L (AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L (AS K) (00935)	ALKA- LINITY LAB (MG/L AS (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS (00955)	SOLIDS, RESIDUE AT 180 DEG. C (MG/L SOLVED (MG/L AS N) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	
UNION COUNTY											
AUG 1990 09...	--	--	--	--	--	--	--	--	0.100	0.400	
	410625094074901	07329W24ADDC									
OCT 1989 17...	--	--	--	--	--	--	--	--	3.30	<0.100	
	403844091442901	06808W35DABB									
AUG 1990 16...	--	--	--	--	--	--	--	--	<0.100	5.70	
	404005092094901	06811W30ABBB									
OCT 1989 20...	--	--	--	--	--	--	0.15	--	2.50	<0.100	
	410907092375101	07315W06CADD									
OCT 1989 19...	--	--	--	--	--	--	--	--	5.90	<0.100	
	411806093440501	07525W16ADCA									
AUG 1990 15...	12	1.0	223	82	76	0.30	28	748	0.400	<0.100	
	412013091485701	07608W31DDCC	08701	1957WEST CHESTER	1	(LAT 41 20 13N LONG 091 48 57W)					
AUG 1990 16...	--	--	--	--	--	--	--	--	<0.100	1.90	
	431556093375401	09824W26DDCC	00304	1934FOREST CITY	2	(LAT 43 15 56N LONG 093 37 54W)					
JUL 1990 25...	--	--	--	--	--	--	--	--	<0.100	0.700	
	431829091472001	09808W16ACAD									
AUG 1990 24...	11	3.3	293	26	35	0.10	13	404	2.00	<0.100	
	422924096041801	08944W29CCDD									
JUL 1990 25...	--	--	--	--	--	--	--	--	7.40	<0.100	
	422317095522201	08843W32DCBC									
AUG 1990 14...	--	--	--	--	--	--	--	--	0.500	1.40	

GROUND-WATER-QUALITY DATA

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DATE	PHOS-	IRON,	MANGA-	METRI-			METOLA-			TRI-	
	PHORUS	DIS-	NESE,	BUZIN	ALA-	CHLOR	IN	WHOLE	BUTY-	FLURA-	
	ORTHO,	SOLVED	DIS-	ATRA-	CYAN-	IN	CHLOR	TOTAL	WATER	LATE	LIN
(MG/L)	(UG/L)	(UG/L)	ZINE,	AZINE	WHOLE	RECOVER	WATER	(UG/L)	(UG/L)	TOTAL	
AS P)	AS FE)	AS MN)	TOTAL	TOTAL	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	RECOVER	
			(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	[Pesticide concentration expressed as total recoverable]
											(99901) (39030)

410625094074901 07329W24ADDC UNION COUNTY
1971LORIMOR 1 (LAT 41 06 25N LONG 094 07 49W)

AUG 1990 09... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

403844091442901 06808W35DABB VAN BUREN COUNTY
1941FARMINGTON 1 (LAT 40 38 44N LONG 091 44 29W)

OCT 1989 17... <0.100 -- -- <0.10 0.16 <0.10 <0.10 <0.10 <0.10 -- <0.10

404005092094901 06811W30ABBB 1961MILTON 2 (LAT 40 40 05N LONG 092 09 49W)

AUG 1990 16... 0.400 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

410907092375101 07315W06CADD WAPELLO COUNTY
1970EDDYVILLE 2 (LAT 41 09 07N LONG 092 37 51W)

OCT 1989 20... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 -- <0.10

411806093440501 07525W16ADCA WARREN COUNTY
1979SAINT MARYS 2 (LAT 41 18 06N LONG 093 44 05W)

OCT 1989 19... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 -- <0.10

413040093290501 07823W34DDBD 1979CARLISLE 5 (LAT 41 30 40N LONG 093 29 05W)

AUG 1990 15... <0.100 1800 2000 <0.10 <0.10 <0.10 <0.20 <0.20 <0.10 <0.10

412013091485701 07608W31DDCC WASHINGTON COUNTY
08701 1957WEST CHESTER 1 (LAT 41 20 13N LONG 091 48 57W)

AUG 1990 16... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

431556093375401 09824W26DDCC WINNEBAGO COUNTY
00304 1934FOREST CITY 2 (LAT 43 15 56N LONG 093 37 54W)

JUL 1990 25... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

431829091472001 09808W16ACAD WINNESHEIK COUNTY
1980DECORAH 7 (LAT 43 18 29N LONG 091 47 20W)

AUG 1990 24... <0.100 <20 <20 0.15 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

422924096041801 08944W29CCDD WOODBURY COUNTY
1934MOVILLE 2 (LAT 42 29 24N LONG 096 04 18W)

JUL 1990 25... 0.200 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

422317095522201 08843W32DCBC 1973ANTHON 4 (LAT 42 23 17N LONG 095 52 22W)

AUG 1990 14... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

GROUND-WATER-QUALITY DATA

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD		TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO ₃) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
				PRIOR	TO SAMPLING (MIN) (72004)						
WOODBURY COUNTY											
422838095470501 08942W34DDBC				1979CORRECTIONVILLE 3 (LAT 42 28 38N LONG 095 47 05W)							
AUG 1990 14...	1300	111ALVM	100	90	12.0	845	7.2	--	--	--	
422759095402501 08842W01ADCC				1950CUSHING 1 (LAT 42 27 59N LONG 095 40 25W)							
AUG 1990 14...	1430	111ALVM	90	20	11.0	775	7.4	--	--	--	
421405095433001 08642W27BCDA				1939DANBURY 3 (LAT 42 14 05N LONG 095 43 30W)							
AUG 1990 15...	1600	111ALVM	100	20	13.5	920	7.1	--	--	--	
421705095533601 08643W06DCCB				1954OTO 2 (LAT 42 17 05N LONG 095 53 36W)							
AUG 1990 16...	1500	111ALVM	40	25	12.5	1160	7.1	--	--	--	
422927096252901 08947W29CCDAD				1976SIOUX CITY RIVER 6 (LAT 42 29 27N LONG 096 25 29W)							
AUG 1990 22...	1030	111ALVM	950	60	21.0	749	7.5	270	66	26	
422414096212601 08847W30DCABB				1981SERGEANT BLUFF 5 (LAT 42 24 14N LONG 096 21 26W)							
AUG 1990 22...	1130	111ALVM	E75	E60	13.0	1320	7.2	660	190	44	
422441096124001 08846W28BCBA				22795 1971BRONSON 1 (LAT 42 24 41N LONG 096 12 40W)							
SEP 1990 05...	0615	112PLSC	--	45	11.0	472	7.5	--	--	--	
WORTH COUNTY											
431943093041801 09819W03DCDC				00700 1938GRAFTON 1 (LAT 43 19 43N LONG 093 04 18W)							
JUL 1990 23...	1515	344CDVL	100	15	13.0	490	6.9	--	--	--	
423954093535801 09126W27CAAD				WRIGHT COUNTY							
				1952EAGLE GROVE 3 (LAT 42 39 54N LONG 093 53 58W)							
JUL 1990 25...	1030	112PLSC	350	90	15.0	620	7.0	--	--	--	

GROUND-WATER-QUALITY DATA

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DATE	POTAS-	ALKA-	CHLO-	SULFATE	FLUO-	SILICA,	SOLIDS,	NITRO-	NITRO-
	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SIUM, DIS- SOLVED (MG/L AS K) (00935)	LINITY LAB CACO3) (90410)	RISE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	RISE, DIS- SOLVED (MG/L AS F) (00950)	SOLVED (MG/L AS SIO2) (00955)	RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L AS N) (70300)	GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
WOODBURY COUNTY									
AUG 1990 14...	--	--	--	--	--	--	--	<0.100	0.100
1979CORRECTIONVILLE 3 (LAT 42 28 38N LONG 095 47 05W)									
AUG 1990 14...	422838095470501	08942W34DDBC	1950CUSHING 1 (LAT 42 27 59N LONG 095 40 25W)						
AUG 1990 14...	--	--	--	--	--	--	--	12.0	<0.100
421405095433001 08642W27BCDA 1939DANBURY 3 (LAT 42 14 05N LONG 095 43 30W)									
AUG 1990 15...	--	--	--	--	--	--	--	12.0	<0.100
421705095533601 08643W06DCCB 1954OTO 2 (LAT 42 17 05N LONG 095 53 36W)									
AUG 1990 16...	--	--	--	--	--	--	--	5.20	<0.100
422927096252901 08947W29CCDAD 1976SIOUX CITY RIVER 6 (LAT 42 29 27N LONG 096 25 29W)									
AUG 1990 22...	64	6.7	164	15	200	0.55	9.8	482	0.100
422414096212601 08847W30DCABB 1981SERGEANT BLUFF 5 (LAT 42 24 14N LONG 096 21 26W)									
AUG 1990 22...	62	17	356	17	380	1.6	10	938	0.100
422441096124001 08846W28BCBA 22795 1971BRONSON 1 (LAT 42 24 41N LONG 096 12 40W)									
SEP 1990 05...	--	--	--	--	--	--	--	0.500	<0.100
431943093041801 09819W03DCDC 00700 1938GRAFTON 1 (LAT 43 19 43N LONG 093 04 18W)									
JUL 1990 23...	--	--	--	--	--	--	--	<0.100	<0.100
423954093535801 09126W27CAAD WRIGHT COUNTY 1952EAGLE GROVE 3 (LAT 42 39 54N LONG 093 53 58W)									
JUL 1990 25...	--	--	--	--	--	--	--	0.100	0.900

GROUND-WATER-QUALITY DATA

DATE	PHOS-	IRON,	MANGA-	METRI-				METOLA-		TRI-
	PHORUS ORTHO, DIS- SOLVED (MG/L AS P)	DIS- SOLVED (UG/L AS FE)	NESE, DIS- SOLVED (UG/L AS MN)	ATRA- ZINE, TOTAL (UG/L)	CYAN- AZINE TOTAL (UG/L)	BUZIN WHOLE WATER (UG/L)	ALA- IN TOTAL (UG/L)	CHLOR IN RECOVER (UG/L)	CHLOR IN WHOLE WATER (UG/L)	BUTY- LATE TOTAL (UG/L)	FLURA- LIN RECOVER (UG/L)
				[Pesticide concentration expressed as total recoverable]						
	(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	(99901)	(39030)

422838095470501 08942W34DDBC WOODBURY COUNTY
1979CORRECTIONVILLE 3 (LAT 42 28 38N LONG 095 47 05W)

AUG 1990
14... 0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

422759095402501 08842W01ADCC 1950CUSHING 1 (LAT 42 27 59N LONG 095 40 25W)

AUG 1990
14... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

421405095433001 08642W27BCDA 1939DANBURY 3 (LAT 42 14 05N LONG 095 43 30W)

AUG 1990
15... 1.40 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

421705095533601 08643W06DCCB 1954OTO 2 (LAT 42 17 05N LONG 095 53 36W)

AUG 1990
16... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

422927096252901 08947W29CCDAD 1976SIOUX CITY RIVER 6 (LAT 42 29 27N LONG 096 25 29W)

AUG 1990
22... <0.100 60 240 0.12 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

422414096212601 08847W30DCABB 1981SERGEANT BLUFF 5 (LAT 42 24 14N LONG 096 21 26W)

AUG 1990
22... <0.100 1100 120 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

422441096124001 08846W28BCBA 22795 1971BRONSON 1 (LAT 42 24 41N LONG 096 12 40W)

SEP 1990
05... 0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

431943093041801 09819W03DCDC WORTH COUNTY
00700 1938GRAFTON 1 (LAT 43 19 43N LONG 093 04 18W)

JUL 1990
23... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

423954093535801 09126W27CAAD WRIGHT COUNTY
1952EAGLE GROVE 3 (LAT 42 39 54N LONG 093 53 58W)

JUL 1990
25... <0.100 -- -- <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10

PRECIPITATION WATER-QUALITY DATA

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MCNAY RESEARCH STATION NEAR CHARITON, IOWA

LOCATION.--Lat 40°57'47", long 93°23'34", in SW1/4 NE1/4 sec. 9, T.71 N., R.23 W., Lucas County, Hydrologic Unit 10280201, 3.1 mi east and 2.0 mi north of Derby, Iowa, 3.4 mi west and 2.8 mi south of Chariton, Iowa.

OWNER.--U.S. Geological Survey.

PERIOD OF RECORD.--September 1984 to current year.

INSTRUMENTATION.--Wet/dry precipitation collector, weighing-bucket type recording rain gage with alter wind shield and event recorder. National Weather Service standard 8-inch rain and snow gage (back-up only).

REMARKS.--Samples marked with an asterik (*) were dry or contained little water. Fifty (50) ml of dilution water was added to the sample bucket to dissolve dry precipitate and then analyzed.

EXTREMES FOR PERIOD OF RECORD.--Maximum field pH, 7.07, April 19 to April 26, 1988; minimum field pH, 3.84, February 12 to February 19, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum field pH, 6.71, June 26 to July 38; minimum field pH, 4.46, April 17-24.

WET DEPOSITION DATA

DATE	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (US/cm) (00095)	CALCIUM (AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L) (00925)	POTAS- SIUM, DIS- SOLVED (MG/L) (00935)	SODIUM, DIS- SOLVED (MG/L) (00930)	AMMONIA DIS- SOLVED (MG/L) (00608)	NITRO- GEN, DIS- SOLVED (MG/L) (00618)	NITRO- GEN, DIS- SOLVED (MG/L) (00940)	CHLO- RIDE, DIS- SOLVED (MG/L) (00945)	SULFATE DIS- SOLVED (MG/L) (00671)	PHOS- PHORUS ORTHO, DIS- (MG/L) (00671)	
OCT 03-10	4.74	18.2	0.388	0.024	0.031	0.066	0.506	0.333	0.11	2.41	<0.007		
OCT 10-17	4.77	18.9	0.836	0.077	0.050	0.084	0.584	0.453	0.11	2.54	<0.007		
OCT 17-24	--	--	--	--	--	--	--	--	--	--	--	--	--
OCT 24-31	4.82	11.6	0.105	0.014	0.016	0.061	0.280	0.198	0.10	1.25	<0.007		
OCT 31-													
NOV 07	--	--	--	--	--	--	--	--	--	--	--	--	--
NOV 07-14	--	--	--	--	--	--	--	--	--	--	--	--	--
NOV 14-21	--	--	--	--	--	--	--	--	--	--	--	--	--
NOV 21-28	--	--	--	--	--	--	--	--	--	--	--	--	--
NOV 28-													
DEC 05	--	--	--	--	--	--	--	--	--	--	--	--	--
DEC 05-12	6.21	17.1	0.635	0.046	<0.028	0.230	<0.140	0.204	0.46	0.37	<0.060		
DEC 12-19	4.97	4.1	0.418	0.014	0.005	0.020	0.047	0.240	0.07	0.20	<0.007		
DEC 19-26	--	--	--	--	--	--	--	--	--	--	--	--	--
DEC 26 1989- JAN 02 1990	--	--	0.755	0.044	0.062	0.280	0.171	0.138	0.44	1.09	<0.024		
JAN 02-09	5.02	10.9	0.230	0.020	0.017	0.049	0.576	0.386	0.09	1.32	<0.007		
JAN 09-16	--	--	--	--	--	--	--	--	--	--	--	--	--
JAN 16-23	5.00	11.2	0.191	0.017	0.012	0.091	0.350	0.304	0.14	1.29	<0.007		
JAN 23-30	--	--	--	--	--	--	--	--	--	--	--	--	--
JAN 30-													
FEB 06	4.86	20.3	0.447	0.048	0.026	0.062	0.754	0.542	0.12	2.27	<0.007		
FEB 06-13	--	--	--	--	--	--	--	--	--	--	--	--	--
FEB 13-20	5.00	10.8	0.729	0.057	0.052	0.086	0.202	0.293	0.12	1.82	<0.007		
APR 17-24	4.46	22.0	0.429	0.038	0.030	0.111	0.420	0.466	0.18	2.58	<0.007		
APR 24-													
MAY 01	5.04	5.8	0.055	0.017	0.018	0.056	0.257	0.144	0.10	0.55	<0.007		
MAY 01-08	4.82	10.1	0.189	0.017	0.020	0.024	0.163	0.231	0.07	1.06	<0.007		

PRECIPITATION WATER-QUALITY DATA.--Continued.

MCNAY RESEARCH STATION NEAR CHARITON, IOWA

WET DEPOSITION DATA

DATE	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
MAY 08-15	5.29	8.1	0.268	0.023	0.024	0.035	0.264	0.235	0.10	1.03	<0.007
MAY 15-22	5.24	8.7	0.204	0.024	0.076	0.105	0.195	0.167	0.14	1.16	<0.007
MAY 22-29	4.59	20.4	0.260	0.027	0.036	0.042	0.591	0.302	0.11	2.68	<0.007
MAY 29-JUN 05	--	--	3.281	0.835	6.240	0.263	19.256	0.499	1.84	5.23	4.319
JUN 12-19	5.11	9.4	0.367	0.033	0.037	0.127	0.327	0.262	0.17	1.35	<0.007
JUN 19-26	5.47	10.4	0.527	0.044	0.063	0.092	0.451	0.317	0.16	1.62	<0.007
JUN 26-JUL 03	6.71	20.2	1.823	0.091	0.104	0.085	0.700	0.553	0.15	1.88	<0.007
JUL 03-10	5.29	14.3	0.662	0.058	0.543	0.098	1.424	0.297	0.29	1.06	0.111
JUL 10-17	5.37	7.8	0.292	0.031	0.024	0.056	0.412	0.264	0.13	0.95	<0.007
JUL 17-24	5.10	6.0	0.201	0.015	0.012	0.041	0.350	0.272	0.16	0.12	<0.007
JUL 24-31	4.67	13.1	0.183	0.018	0.006	0.046	0.148	0.195	0.12	1.38	<0.007
JUL 31-AUG 07	5.70	5.2	0.132	0.010	0.101	0.010	0.195	0.082	0.12	0.55	0.095
AUG 07-14	4.88	12.6	0.327	0.031	0.024	0.018	0.428	0.297	0.08	1.52	<0.007
AUG 14-21	4.88	--	0.168	0.016	0.024	0.044	0.280	0.331	0.10	0.87	<0.007
AUG 21-28	--	--	--	--	--	--	--	--	--	--	--
AUG 28-SEP 04	6.01	13.1	0.950	0.063	0.031	0.077	0.537	0.442	0.10	1.71	<0.007
SEP 04-11	5.20	9.8	0.287	0.029	0.017	0.014	0.366	0.249	0.07	1.15	<0.007
*SEP 11-18	4.65	17.3	0.512	0.036	0.024	0.038	0.241	0.309	0.11	2.26	<0.007
*SEP 18-25	4.60	16.0	0.071	0.009	0.006	0.005	0.280	0.275	0.07	1.41	<0.007
SEP 25-OCT 02	--	--	4.210	0.300	0.123	0.281	1.556	1.430	0.24	4.65	<0.007

PRECIPITATION WATER-QUALITY DATA

417

BIG SPRING FISH HATCHERY NEAR ELKADER, IOWA

LOCATION.--Lat 42°54'35", long 91°28'11", in SE1/4 SE1/4 sec. 31, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, 3.0 mi north and 2.8 mi west of Elkader, Iowa.

OWNER.--U.S. Geological Survey.

PERIOD OF RECORD.--August 1984 to current year.

INSTRUMENTATION.--Wet/dry precipitation collector, weighing-bucket type recording rain gage with alter wind shield and event recorder and National Weather Service standard 8-inch rain and snow gage (back-up only).

REMARKS.--Samples marked with an asterik (*) were dry or contained little water. Fifty (50) ml of dilution water was added to the sample bucket to dissolve dry precipitate and then analyzed.

EXTREMES FOR PERIOD OF RECORD.--Maximum field pH, 6.98, May 5-12, 1987, June 26 to July 3, 1990; minimum field pH, 3.83, July 30 to August 6, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum field pH, 6.98 June 26 to July 3; minimum field pH, 4.19, May 22-29.

WET DEPOSITION DATA

DATE	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	CALCIUM DIS- SOLVED (MG/L) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L) (00825)	POTAS- SIUM, DIS- SOLVED (MG/L) (00935)	NITRO- GEN, SODIUM, AMMONIA DIS- SOLVED (MG/L) (00930)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L) (00608)	CHLO- RIDE, NITRATE DIS- SOLVED (MG/L) (00618)	SULFATE DIS- SOLVED (MG/L) (00940)	PHOS- PHORUS DIS- SOLVED (MG/L) (00945)	ORTHO- (00671)	
OCT 03-10	4.20	32.3	0.379	0.049	0.048	0.041	0.350	0.349	0.10	3.06	<0.007	
OCT 10-17	5.98	18.5	2.237	0.292	0.078	0.090	0.560	0.380	0.12	2.63	<0.007	
OCT 17-24	--	--	--	--	--	--	--	--	--	--	--	
OCT 24-31	4.68	12.8	0.225	0.039	0.026	0.093	0.428	0.273	0.14	1.72	<0.007	
OCT 31-												
NOV 07	--	--	0.140	0.783	0.057	0.105	0.638	0.353	0.14	1.34	<0.007	
NOV 07-14	--	--	--	--	--	--	--	--	--	--	--	
NOV 14-21	--	--	--	--	--	--	--	--	--	--	--	
NOV 21-28	--	--	--	--	--	--	--	--	--	--	--	
NOV 28-												
DEC 05	--	--	--	--	--	--	--	--	--	--	--	
DEC 05-12	--	--	--	--	--	--	--	--	--	--	--	
DEC 12-19	--	--	1.280	0.154	0.363	0.483	<0.016	<0.007	0.40	0.72	<0.007	
DEC 19-26	--	--	--	--	--	--	--	--	--	--	--	
DEC 26 1989-												
JAN 02 1990	5.09	11.8	0.283	0.063	0.024	0.104	0.241	0.477	0.20	0.67	<0.007	
JAN 02-09	5.74	20.9	0.635	0.060	0.032	0.119	1.260	1.150	0.19	2.27	<0.007	
JAN 09-16	--	--	--	--	--	--	--	--	--	--	--	
JAN 16-23	6.16	12.5	0.292	0.067	0.023	0.205	0.848	0.428	0.32	1.85	<0.007	
JAN 23-30	5.69	17.2	0.549	0.072	0.030	0.113	0.980	0.702	0.19	2.26	<0.007	
JAN 30-												
FEB 06	5.39	7.8	0.306	0.071	0.021	0.103	0.233	0.400	0.12	0.46	<0.007	
FEB 06-13	--	--	--	--	--	--	--	--	--	--	--	
FEB 13-20	5.77	9.6	0.596	0.109	0.021	0.066	0.296	0.486	0.12	0.88	<0.007	
FEB 20-27	6.67	15.9	0.865	0.113	0.030	0.054	0.864	0.255	0.07	2.16	<0.007	

PRECIPITATION WATER-QUALITY DATA.--Continued

BIG SPRINGS FISH HATCHERY NEAR ELKADER, IOWA

WET DEPOSITION DATA

DATE	PH (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (US/cm) (00095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, DIS- SOLVED (MG/L AS N) (00618)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
FEB 27-	--	--	--	--	--	--	--	--	--	--	--	--
MAR 06-13	4.80	15.1	0.088	0.022	0.016	0.087	0.482	0.284	0.14	1.68	<0.007	
MAR 13-20	5.55	8.5	0.108	0.025	0.033	0.102	0.326	0.140	0.16	0.959	<0.007	
APR 10-17	6.38	11.9	0.208	0.054	0.065	0.022	0.941	0.317	0.11	1.62	<0.007	
APR 17-24	4.91	14.7	0.251	0.029	0.050	0.124	0.412	0.253	0.21	2.01	<0.007	
APR 24-MAY 01	6.60	20.5	0.903	0.134	0.072	0.076	1.353	0.597	0.18	2.80	<0.007	
MAY 01-08	6.30	7.4	0.515	0.148	0.022	0.038	0.195	0.242	0.11	1.04	<0.007	
MAY 08-15	6.06	10.5	0.567	0.088	0.041	0.060	0.700	0.317	0.09	1.90	<0.007	
MAY 15-22	5.26	9.7	0.231	0.045	0.031	0.037	0.467	0.302	0.12	1.33	<0.007	
MAY 22-29	4.19	40.1	0.135	0.026	0.012	0.013	0.498	0.559	0.12	3.83	<0.007	
MAY 29-JUN 05	6.06	5.95	0.398	0.081	0.072	0.078	0.218	0.124	0.13	0.84	<0.007	
JUN 05-12	4.95	19.9	0.575	0.104	0.055	0.141	0.615	0.646	0.23	2.25	<0.007	
JUN 19-26	5.95	5.9	0.198	0.030	0.016	0.018	0.350	0.164	0.06	0.75	<0.007	
JUN 26-JUL 03	6.98	30.4	3.048	0.342	0.166	0.186	1.463	1.210	0.29	3.55	<0.007	
JUL 03-10	6.25	13.0	0.762	0.134	0.083	0.080	0.521	0.446	0.20	1.73	<0.007	
JUL 10-17	6.54	9.8	0.342	0.126	0.030	0.028	0.677	0.246	0.10	1.37	<0.007	
JUL 17-24	5.83	8.3	0.381	0.041	0.018	0.051	0.373	0.264	0.14	1.06	<0.007	
JUL 24-31	4.59	19.8	0.524	0.171	0.019	0.036	0.124	0.371	0.14	2.46	<0.007	
JUL 31-AUG 07	6.23	11.4	0.758	0.157	0.044	0.052	0.482	0.415	0.17	1.40	<0.007	
AUG 07-14	--	--	4.705	0.327	0.058	0.158	0.163	0.779	0.45	1.82	0.079	
AUG 14-21	5.34	5.8	0.089	0.009	0.004	0.038	0.350	0.142	0.09	0.52	<0.007	
AUG 21-28	--	--	--	--	--	--	--	--	--	--	--	
AUG 28-SEP 04	--	--	--	--	--	--	--	--	--	--	--	
SEP 04-11	--	--	--	--	--	--	--	--	--	--	--	
SEP 11-18	--	--	--	--	--	--	--	--	--	--	--	
SEP 18-25	4.38	30.7	0.138	0.032	0.015	0.021	0.685	0.400	0.16	0.95	<0.007	
SEP 25-OCT 2	--	--	7.215	0.326	0.177	0.282	1.564	2.508	0.48	7.56	<0.031	

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FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM UNITS (SI)

The following factors may be used to convert the inch-pound units published herein to the International System of Units (SI).

Multiply inch-pound units	By	To obtain SI units
<i>Length</i>		
inches (in)	2.54×10^1	millimeters (mm)
feet (ft)	2.54×10^{-2}	meters (m)
miles (mi)	3.048×10^{-1}	meters (m)
	1.609×10^0	kilometers (km)
<i>Area</i>		
acres	4.047×10^3	square meters (m^2)
	4.047×10^{-1}	square hectometers (hm^2)
square miles (mi^2)	4.047×10^{-3}	square kilometers (km^2)
	2.590×10^0	square kilometers (km^2)
<i>Volume</i>		
gallons (gal)	3.785×10^0	liters (L)
million gallons	3.785×10^0	cubic decimeters (dm^3)
	3.785×10^{-3}	cubic meters (m^3)
cubic feet (ft^3)	3.785×10^3	cubic meters (m^3)
	2.832×10^1	cubic hectometers (hm^3)
cfs-days	2.832×10^2	cubic decimeters (dm^3)
acre-feet (acre-ft)	2.447×10^3	cubic meters (m^3)
	2.447×10^{-3}	cubic hectometers (hm^3)
	1.233×10^3	cubic meters (m^3)
	1.233×10^{-3}	cubic hectometers (hm^3)
	1.233×10^6	cubic kilometers (km^3)
<i>Flow</i>		
cubic feet per second (ft^3/s)	2.832×10^1	liters per second (L/s)
	2.832×10^1	cubic decimeters per second (dm^3/s)
gallons per minute (gal/min)	2.832×10^{-2}	cubic meters per second (m^3/s)
	6.309×10^{-2}	liters per second (L/s)
	6.309×10^{-2}	cubic decimeters per second (dm^3/s)
million gallons per day	6.309×10^{-5}	cubic meters per second (m^3/s)
	4.381×10^1	cubic decimeters per second (dm^3/s)
	4.381×10^{-2}	cubic meters per second (m^3/s)
<i>Mass</i>		
tons (short)	9.072×10^{-1}	megagrams (Mg) or metric tons

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